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PREFACE

The establishment of a new scientific journal is a matter for serious consideration, and doubly so at this critical period. The points that must be thoroughly weighed are, first, the need of the additional publication; second, the effects of its establishment on existing periodicals; and third, the special service it can render under actual conditions.

The need of an American journal devoted exclusively to Physical Anthropology has been felt for many years. The United States is the only one of the larger civilized countries that as yet has no periodical devoted to this branch of science. Even Portugal and Switzerland now have such journals. The progress of Physical Anthropology in this country, and the unequaled richness and importance of the problems with which this branch of science is here confronted, makes the establishment of a Journal that will properly represent this branch very desirable. As it is we have in America no reviews of somatological literature; no bibliography; no way of keeping contact, except individually, with anthropological activities and problems in other countries; and very limited means of showing what we are doing in the way of research, exploration, collection, and instruction.

We need the Journal to supplement the activities of and to serve as the mouthpiece of the Committee on Anthropology of the National Research Council. As it is, there is no way of making the recommendations of the Committee more generally known and understood. Moreover, we are now engaged in a tremendous world struggle which involves and is developing many problems in the solution or the regulation of which Physical Anthropology may be of assistance, and this can be done most effectively with the aid of a proper periodical.

The Journal is needed, furthermore, to make our work better known

to medical men, sociologists, criminologists, educators, and others; workers in related fields, but with whom we now have scarcely any connection. And we need the Journal to assist in such important prospective national movements as the universal training, the anthropological survey of the United States population, the development of the census, the regulation of immigration, eugenic progress, and all other endeavors tending to knowing, safeguarding, and advancing the physical status of man in this country.

As to the effect of the new Journal on related and already established periodicals, all that needs to be mentioned is that the new Journal will not encroach upon the field of any of those now existing, but will fill a void that now exists among these. The best sign of this is the benevolent and helpful attitude shown toward the new Journal since the inception of its plan by such periodicals as the *American Anthropologist* and the *Journal of Heredity*.

In applying to his colleagues for editorial and literary assistance the Editor has met with uniformly encouraging response, and there is a substantial hope that the Journal will receive in every respect adequate support, so that it may before long take an honorable place among the foremost and most useful scientific journals of this country.—THE EDITOR.

RESEARCH. SPECIAL COMMUNICATIONS

PHYSICAL ANTHROPOLOGY: ITS SCOPE AND AIMS; ITS HISTORY AND PRESENT STATUS IN AMERICA

ALEŠ HRDLÍČKA

A. PHYSICAL ANTHROPOLOGY, ITS SCOPE AND AIMS¹

I. DEFINITIONS

An understanding of whatsoever exists, formulated and preserved in memory or in writing, is *knowledge*; and systematic search for knowledge, on the basis of existing foundations of learning, is *science*. Being of the utmost utility, science constitutes the most important intellectual function of mankind.

A branch of science may be defined as a portion of systematized research that extends to closely related phenomena and has become the special function of a class of qualified observers. One of the most interesting and far-reaching of such branches is Anthropology. This has been frequently but somewhat vaguely defined as "the science of man;" perhaps a more fitting definition would be "the comparative science of man," for its main characteristic, the criterium in fact, which differentiates it from many closely related branches of science, is that of comparison. More specifically Anthropology may also be defined as that portion of systematic research which deals with the differences, and causes of the differences, in structure, in function, and in all other manifestations of mankind, according to time, variety, place, and condition.

In the course of its development, or since the beginning of the last century, Anthropology has become differentiated into a number of important branches, which follow correlated yet separate aims, and which, while often coöperating, are developing in large measure independently and through distinct personnel. In America since Powell's

¹ Published in preliminary form in *Science*, N. S., XXVIII, July 10, 1908, 33-43; and *The Anatomical Record*, II, no. 5, 1908, 182-195.

time the recognized main subdivisions of Anthropology are: Archeology, or the study of man's products and material accomplishments in the past; Ethnology, or the study of man's intellectual, linguistic, and present material activities; and Physical Anthropology, or the study of racial anatomy, physiology, and pathology.

It is the last-named branch, or Physical Anthropology, which interests us exclusively in this place. Formerly known simply as "Anthropology," it was defined by its principal founder and promoter, Paul Broca, as "the natural history of the genus homo," or, more in detail, as "that science which has for its object the study of mankind as a whole, in its parts, and in its relation with the rest of nature."² It can be defined to-day in the briefest form as the *study of man's variation*. It is that part of Anthropology which occupies itself in a comparative way with the study of the human body and its inseparable functions. It deals with the causes and ways of human evolution, and with the development, transmission, classification, effects, and tendencies of man's bodily and functional differences. It is, briefly and comprehensively, the research into man's anatomical and physiological variation.

The comparative element shows clearly the position of Physical Anthropology in relation to general human anatomy and physiology, and general biology. The objects of general human anatomy and physiology are essentially the pursuit of knowledge regarding structure and function in the average man of the present day; while the chief aims of general biology are to trace the structural and functional relations of the various species of living beings to one another, and to seek the general causes and processes of organic variation and evolution. Physical Anthropology is a continuation—and extension—of all these to the chronological, racial, social, and even pathological groupings of mankind, and it reaches with its investigations beyond man only in so far as may be necessary to an understanding of the phenomena which it encounters. If it had not its present designation it could well be called "advanced human anatomy, physiology, and biology."

² Article "Anthropologie" in Dict. encycl. d. sci. méd., vol. V, p. 276, Paris, 1866; also in Broca's *Memoires d'Anthropologie*, Paris, 1871, vol. I, p. 1. References to numerous definitions in R. Martin, *System d. (physischen) Anthropologie*, etc., *Korr.-Bl. d. d. Anthr. Ges.*, 1907, Nr. 9/12, and in his *Lehrbuch d. Anthr.*, Jena, 1914. See also L. Manouvrier, *Rev. de l'École d'Anthr.*, 1904, pp. 397-410; F. Boas, "Anthropology," pp. 1-28, Columbia University Press, N. Y., 1908; and F. Frassetto, *Lezioni di Antropologia*, 3 vol., Rome, 1909-13.

II. HISTORICAL

Physical Anthropology is a comparatively recent branch of science, though its roots extend far back in the development of human reflection. It is interesting to know that one of its main incentives was the discovery of America, with its new race of people, no mention of which occurred in any of the old accounts or traditions. This most sensational event was followed by discoveries of other lands and peoples in the Pacific, and this was succeeded by rapidly increasing knowledge of organized beings in general, including the anthropoid apes. All this led irresistibly to new lines of thought by scientific men, as well as to a general doubt as to the correctness of the old theories of creation; and the mental fermentation, though greatly impeded by old dogmas, lack of precise data and collections, and the backward state of many collateral branches of science, progressed until it finally pierced the clouds of the past and manifested itself in anthropological publications. Peyrère's "Preadamities" appeared in 1655, and, notwithstanding prohibitions and the small real worth of the book, it was received with eagerness and read very extensively. In 1699 was published Tyson's classic on "Comparative Anatomy of Man and Monkey." And in 1735 one of the actual corner stones of modern anthropology was laid by Linnaeus. It was in the "Systema Naturae" of this great naturalist that man for the first time was placed within the line of living beings in general, and that his close organic relations with the rest of the primates was authoritatively expressed. Then followed Buffon, the precursor of Lamarck, with whom the new branch of the natural science of man took more definite form, and thenceforward the progress toward Anthropology, as differentiated to-day, has been continuous.

Those who contributed more directly toward the development of Physical Anthropology are too numerous to mention: they really include all the prominent naturalists and anatomists of the latter half of the eighteenth and the first half of the nineteenth century, such as Daubenton, Camper, Lamarck, Blumenbach, Soemmering, Lacépède, Cuvier, Retzius, the brothers Geoffroy, Lawrence, Edwards, Serres, Pritchard, Morton, and many others.³ Even the teachings

³ For details concerning the history of anthropology, see T. Benlyshe, *Mem. Anthr. Soc.*, London, vol. I, 1863-64, pp. 335-458; P. Topinard's *Éléments d'Anthropologie générale*, Paris, 1885, pp. 1-148; L. Niederle, *Athenaeum*, Prague, 1889 (repr. pp. 1-19); F. Boas, *Science*, October 21, 1904, pp. 513-524; references to more or less direct contributions to the subject in R. Martin, *op. cit.*, and in "Recent Progress in American Anthropology," *Amer. Anthr.*, vol. VIII, no 3, 1906, pp. 441-556.

of Gall, however erroneous in application, have aided its growth, for they stimulated research into the variations of the head, skull, and brain, gave rise to various craniological collections, and were the main incentive to Morton's ultimate and remarkable work, the "Crania Americana." The discussions of the monogenists and polygenists, particularly those of the nineteenth century, were also of much importance and assistance.

The first effort toward an organization of forces in the new field was made as early as 1800, when a small body of scientific men formed themselves, in Paris, into a Society of Students of Man (*Société des observateurs de l'homme*). It was in this little circle that the term Anthropology (used previously as a title for some works on man of philosophical and in a few instances of simple anatomical nature) was employed in something like its present significance. This attempt at organization, however, was premature and was abandoned two years later (1803), after little had been accomplished.

In 1832 the Museum of Natural History in Paris, under the influence of Prof. William Edwards, transformed its chair of Anatomy into that of Natural History of Man, and to this Serres, in 1839, added Anthropology. These were in many respects remarkable steps forward, but the time was not yet ripe for the subject to assume much importance. There were no large collections, no material evidence of man's antiquity or evolution, and the public mind was still to a considerable degree medieval.

From 1839 to 1848 Paris had a Société d'Ethnologie, which included Physical Anthropology, but again with little lasting result. In 1843 the Ethnological Society was founded in England.⁴ It included men like Prichard and Richard Owen, and its main object was the study of primitive races. But it was not until after the beginning of the second half of the nineteenth century, with the advent of Paul Broca and his collaborators, and the founding of the Société d'Anthropologie in Paris (1859),⁵ that the actual birth of the new branch of science may be said to have taken place. This is less than sixty years ago; and how difficult the beginnings were, even then, will be appreciated from the fact that when permission to establish the society was sought, the Minister of Public Instruction, notwithstanding the rank of those who, with Broca, applied for the sanction, refused to countenance

⁴ See Keith, A., Presidential Address (Roy. Anthr. Inst.), *Jour. Roy. Anthr. Inst.*, XLVII, 1917, 12-30.

⁵ L'École d'Anthropologie de Paris, 1876-1906, Paris (F. Alcan), 1907.

the matter. Finally the petition was sent to the Prefect of Police, but that official was equally unwilling, and returned the document to the Ministry. It was not until after the influential intervention of Ambroise Tardieu that one of the chiefs of the police department became convinced that the scientific gentlemen were not quite so dangerous to the welfare of the empire or to society as was suspected, and not finding, moreover, any law that forbade the gathering of fewer than twenty persons, the eighteen future anthropologists were finally informed that their meetings would be tolerated. But Broca was made personally responsible for anything that might be said at the meetings against the government or religion, and for further safety every meeting was to be attended by an officer in plain clothes.

From the establishment of the Société d'Anthropologie in Paris, the progress of the new branch of research was rapid. Before long similar societies came into existence in England (1863), in Germany (1869), and other countries, some of the leading men in medical circles taking active part; the publication of anthropological journals was commenced; an efficient system of anthropometry, with the required instruments, was devised, principally by Broca, and detailed instructions in the system were published by the same author; collections were begun and important lines of investigation undertaken in different parts of Europe as well as in the United States; and in 1876 the École d'Anthropologie was founded in Paris for academic instruction and training in the new branch of research. Finally, in 1885, appeared Paul Topinard's great textbook, the "*Éléments d'Anthropologie générale*," which to this day is a respected and indispensable volume in our laboratories. Much progress was also made during this period in the differentiation of Anthropology as a whole into its present main subdivisions.

But this quarter century of the history of Anthropology as a separate branch of learning—a period of the greatest and most hopeful activity, the detailed and still unwritten history of which is of absorbing interest—was not one of uninterrupted progress. Unexpectedly, and it now seems unjustifiably, a crisis was encountered which seriously affected progress, and from the effects of which Physical Anthropology is only now beginning to recover. This crisis was the result of a schism in anthropometry, begun in 1874 by von Ihering and completed by the German anthropologists at Frankfurt in 1882. This is not a suitable place for a discussion of the causes or the details of the case; suffice it to say that the division resulted in great loss of effort and had a gen-

erally untoward influence on the progress of the science. It is only quite recently that international commissions, composed of foremost anthropologists of all countries, have endeavored to adjust the differences and, by impartially selecting the best from existing methods in anthropometry, to effect a much needed uniformity. Two conferences have been held, one in 1906 at Monaco and the other in 1912 at Geneva,⁶ with much harmony and most encouraging results. A complete agreement on anthropometric methods will be of the greatest importance to the branch and mark an epoch in Physical Anthropology.

This chapter, necessarily condensed and inadequate, may be appropriately concluded with a few words concerning the actual status of Physical Anthropology. The subject, like the entire history of the science, calls for thorough presentation, but this is out of the question at the present time.

Physical Anthropology to-day numbers distinguished followers wherever science flourishes. It has already a bibliography that reaches into tens of thousands of titles. It maintains a number of well-equipped laboratories, where students are trained or may conduct investigations. It possesses most important collections of material, which from year to year increase in numbers and value. It sustains or contributes a large body of original material to anthropological journals of high standing, such as the *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, *L'Anthropologie*, the Journal of the Royal Anthropological Institute of Great Britain and Ireland, *Man*, the *Biometrika*, the *Archivio per l'Antropologia*, the *Giornale per la Morfologia dell'Uomo e dei Primati*, the *Archiv für Anthropologie*, the *Zeitschrift für Morphologie und Anthropologie*, etc. Numerous other results of investigations are disseminated through periodicals devoted to anatomy, general biology, and other subdivisions of anthropology. Finally, it is a subject of instruction in the École d'Anthropologie of Paris, in the Anthropological Institute of the University of Zürich, in various large museums, and in many of the principal universities of both hemispheres. It is still struggling with numerous difficulties, but it has

⁶ See F. v. Luschan, Die Konferenz von Monaco, *Korr.-Bl. d. d. Ges. f. Anthr.* etc., Juli, 1906, pp. 53 et seq., in *Archiv. f. Anthr.*, 1906, H. 1-2, and "Entente internationale pour l'unification des mesures craniométriques et céphalométriques," *L'Anthropologie*, 1906, 559-572; *ibid.*, 1912, 623-627; also "The international agreement for the unification of anthropometric measurements," etc., reported by W. L. H. Duckworth, Univ. of Cambridge, 1912, pp. 1-11.

now a solid foundation, has repeatedly shown itself to be of public and national utility, and has surely before it a future of great importance.

III. RESULTS ACCOMPLISHED

The questions are often asked by those whose preoccupation has not permitted closer insight into this branch of research, What has Physical Anthropology accomplished? and What are its aims for the future? These are legitimate queries and deserve to be answered so far as may be possible.

The amount of work actually done in this branch of science must be considered together with the many obstacles that stood, and to a large extent still stand, in the way of its development and of fruitful investigation.

The most influential of these obstacles was and still is the imperfect state of anatomical knowledge, which in large measure is the starting point of Physical Anthropology. It is obvious that structural comparison, extending to various groups of humanity, can properly be carried on only on the basis of a thorough knowledge of structure in some one type of man, to us preferably the white race. Had Anatomy been able to furnish such a foundation for Physical Anthropology, the progress of the latter would have been very much easier and more rapid. As it was, the new branch commenced to be differentiated while general human anatomy was itself still imperfectly understood, and in consequence it was confronted with the tedious task of establishing or of improving the bases for its future comparisons. Thus a large portion of the work of anthropologists was hitherto and still is almost purely anatomical.

It is safe to say that fifty years ago, when the Société d'Anthropologie was founded in Paris, there was not a single feature of the human organism that was thoroughly well known and understood. Even to this day, with all the excellent work that has been accomplished, there is, it is safe to say, not yet a single bone in the body, and no other organ, the knowledge of which and of its total range of variation is perfect, and that even in the white race, which has been most studied. The splendid anatomical textbooks of the present time give little more than generalities, and are marked by many omissions and imperfections. In special treatises and periodicals the literature is much richer, but in the matter of details there are innumerable lacunæ. Yet details are the essentials of all knowledge, and they are indis-

pensable for anthropological comparisons. It would almost seem from this that the birth of Physical Anthropology had been premature; but if one stops to consider the deep interest its problems have for humanity, it will be seen that its early rise, even if on the but partly prepared soil, was quite natural.

The second obstacle to the progress of Physical Anthropology has been, and to a diminishing extent continues to be, the defective state of collections of requisite material. The third was the dearth of properly trained men; and in the fourth place should be named the difficulties, based on prejudice or incomprehension, attending the collection of accurate anthropological data in many parts of both the uncivilized and the civilized world. Still further impediments that attended this branch of natural science more than others were those which accompanied the elaboration of the necessarily extensive series of data, and especially their publication.

With regard to material, what collections of value to Physical Anthropology existed even as late as half a century ago? Fair beginnings, it is true, had been made before that time in a number of European cities, and a single particularly interesting one on this continent—the collection gathered by Morton in Philadelphia; but all this material was limited to crania, and was useful in arousing curiosity and false expectations rather than in leading to definite progress in our science. It required years of assiduous excavation and collecting before scientific work of any extent could anywhere be attempted. Such collecting, fortunately, has been carried on in a diligent and continued way to this day, until there are in this country alone several great and many lesser gatherings of identified skeletal and other anthropological material, led by that of the U. S. National Museum. Yet even now we are far from the goal in this direction; that is, from collections comprising adequate series of bones of the entire skeleton, besides those of other normal important parts of the body; collections that would enable us to determine the complete range of variation in these parts in at least the most significant groups of mankind. The requirements in this direction will appear more clearly when it is appreciated that, to determine the total range of variation in a single long-bone, such as the humerus, in any group to be studied, there are needed the remains of hundreds of adult individuals of each sex from that group. As it is, even the greatest collections we possess still fall short of the requirements, consequently our investigations can be seldom perfect or final.

The dearth of properly trained men has been and is still a great

hindrance in Physical Anthropology. The cause of this deficiency is simple enough. The branch demands extensive, preferably medical, preparation and arduous application, for which only moderate pecuniary compensation is offered at best. It has not yet reached its full ultimate civic utility and hence receives less public recognition than the applied sciences. Finally, in the centers of anthropological instruction it is too often associated with archeology and ethnology, which in the beginnings are more attractive and capable of diverting the average student in their direction. Under these circumstances the recruiting of regular workers of the right kind is precarious; a new competent physical anthropologist is almost an accident, and the supply of students falls far short of the needs.

The difficulties in gathering the requisite material, and even the crude data alone, have been and are still very great; in fact they are sometimes insurmountable. Religious beliefs, sentimentality and superstition, as well as love, nearly everywhere invest the bodies of the dead with sacredness or awe which no stranger is willingly permitted to disturb. It is seldom appreciated that the remains would be dealt with and guarded with the utmost care, and be used only for the most worthy ends, including the benefit of the living. The mind of the friends sees only annoyance and sacrilege, or fears to offend the spirits of the departed. This may not apply to older remains, but these in turn are frequently defective; yet even old remains are sometimes difficult to acquire. Such conditions, with occasional exceptions, are common among the civilized and savage alike, hence to collect large supplies of material indispensable to Physical Anthropology is often arduous and unsatisfactory. The impediment to the advance of the science that these sentimental conditions constitute is beyond computation. And the difficulties extend even to data that can be derived only from the living. The stumblingblocks due to ignorance and superstition are particularly numerous in the paths of measuring the illiterate, while fears of detection of concealed defects, curiously, are met among the otherwise enlightened. Compare with this the facilities of the zoölogist, botanist, and biologist!

Notwithstanding these and other obstacles, including those placed in the way by the ill-fitted traveler, the incompetent investigator, and the self-assumed authority extending from other branches of science, Physical Anthropology has already accomplished considerable useful work. It has established a system of precise measurements of man and his remains, and furnished the needed instruments; it has

directly advanced general anatomy, particularly that of the skeletal system and the brain of man and other primates, and has contributed to zoölogy, general biology, and other natural sciences; it likewise has established the physical knowledge of the races and many of their subdivisions. Through its activities it has also accelerated the advance of its sister branches, ethnology and archeology. It has given a marked impetus to search for the remains of early man and inspired thorough critical accounts of the physical characteristics of the finds made. It has actuated and to a large extent carried out the study of the development of man from his inception onward; it has brought about physical investigation and through it an enhancement of our knowledge of school children as well as of advanced pupils, of recruits, and of the criminal and other defective, delinquent, or dependent classes; and has led directly to practical systems of identification of criminals. It has participated in and promoted studies in human heredity, degeneration, and hybridity; it has increased our knowledge of the functions and pathology of the human body, and especially of the brain; it has furthered the gathering of vital statistics; and it has already taken steps toward aiding other branches in determining, on the basis of acquired knowledge, ways toward safeguarding and improving the human race. This outline is necessarily condensed, yet it will indicate in a measure that Physical Anthropology, notwithstanding the many and serious obstacles in its path; has already well justified its separate existence and the decrees by which the French Government pronounced it, in 1864 and again in 1889, a *science of public utility*.

IV. AIMS

The object of the final section of this memoir is to outline briefly, yet not too generally, the future field and aims—in a word the future program—of Physical Anthropology, as it now looms before us. Could such a program be perfected, it would itself mean an important step forward. It would, of course, differ somewhat from country to country, but it would nevertheless possess the same essentials.

The future activities of Physical Anthropology must be directed to the improvement of its own organization and means, as well as in the direction of further research. The more thoroughly and efficiently the former is effected, the more important and prompt will be the scientific results.

The main needs—which logically become the aims—of the anthropologists themselves include more regular and extended recruiting of their ranks, and a closer general unity and coöperation. The most urgent impersonal needs are: definite unification and perfection of anthropometry in its entire range; systematization of the methods of treating and recording data; preparation of modern textbooks; improvement and advance in instruction; advance toward strictly specialized periodicals; the compilation of a complete bibliography relating to the subject, and its continuation; the generalization of information concerning collections of material for the benefit of students; the augmentation and improvement of collections; the establishment of adequate anthropological exhibits; and the general diffusion of anthropological knowledge.

Recruiting of the right kind of men is very urgent. It conditions further development and specialization of academic instruction, with ample opportunities at laboratory training; it makes highly desirable an extension of lectures on Physical Anthropology to medical colleges; and, above all, it necessitates pecuniary resources by means of which scholarships may be offered to enable men to be trained in the laboratory and in the field, with an improvement in the prospects of their employment, at reasonable compensation, after the necessary prolonged preparation. The time required for the proper training of a physical anthropologist, including that needed for acquiring indispensable experience, is several years of postgraduate activity; and as the men who are best fitted for such training and most likely to be recruited are those who have completed a medical course, these years of specialized training and labor necessitate a pecuniary loss, which should in some manner be ultimately recouped. Until effective provisions are made to cover these points it cannot be expected that the requisite numbers of students will be attracted by what Physical Anthropology offers in the way of a life work. This applies particularly to the United States, where the prospects of the graduate in medicine, as well as in other sciences, are brighter than in many parts of the Old World. The most suitable means of compensation during the preparatory years would perhaps be through scholarships, continued with the most promising men until permanent positions were secured. The opportunities of employment of well-trained anthropologists are not so few as might seem, and they are bound to increase in the future. The principal problem at present is to secure salaries commensurate with the required preparation for this branch of research and service, and

with the prospects of a man as well equipped had he chosen another vocation.

Closer unity and coöperation among physical anthropologists throughout the world is one of our foremost and cherished aims. The time is surely ripe for closer and universal union of workers in this field. Local and national organizations have their uses, but as the sphere of interest of Physical Anthropology embraces the whole of mankind, and as the branch in its broader aspects is eminently one and pan-human, so we need an international union of all investigators in this line. Important steps in this direction were actually taken before the war, and there exists now, though for the time being necessarily dormant, an International Committee for such purpose.⁷ After the bitterness of the war shall have become sufficiently assuaged, this or a new committee will, it is confidently expected, resume the activities and proceed toward the realization of our hopes for a unit world-wide organization.

Another and even more important aim of Physical Anthropology is the further standardization and perfection of anthropometric methods and instruments. A great stride in this direction was taken by each of the two already mentioned international anthropometric conferences, at Monaco in 1906 and at Geneva in 1912. Much however remains to be done. The very nature of future conferences for this purpose will need modification. Their membership should be sufficiently inclusive, and constituted months if not years ahead. It should, in fact, if at all possible, be permanent. Every proposal should be communicated to all members and ample time afforded for submitting it to proper tests. The ideal arrangement would be a permanent International Anthropometric Board, constituted as a part of the International Organization mentioned in the preceding paragraph, the personnel to consist of the most experienced men in anthropometry in each country. To such a board would be referred all proposals relating to changes or innovations in instruments, in measuring, and in methods of elaborating and presenting anthropological data. Such a body would naturally progress toward the publication of suitable bulletins, and could usefully extend its interest to the supervision if not the control of the manufacture of standard instruments and other indispensable adjuncts for anthropological observations. The ulti-

⁷ Established at the occasion of the XVIII Intern. Congr. of Americanists, at London, 1912; Dr. R. R. Marett of the Exeter College, Oxford, England. is the secretary of the committee.

mate establishment of such a board will be one of the greatest steps toward placing anthropometry on a thoroughly definite, modern, and scientific basis.

In this connection it may not be amiss to refer briefly to the present state of our methods in dealing with anthropometric data. To a considerable extent our ways in this respect are still largely individualistic and empirical. They range from the simplest and defective methods of the pioneers in anthropology to the mazes of the lofty, disdainful "biometrician." In fact it has proceeded so far that not a few workers hesitate, if indeed they are not ashamed, to present their data without the use of mathematical formulæ; and often such formulæ or methods are used, if not to cover defects, at least without due explanation or understanding of their significance. Some degree of regulation in these matters is urgently needed. We must abolish what is imperfect in the old methods and be shown our limitations with the new. Although working largely with measurements and hence with mathematical units, it must not be forgotten that in anthropology, as a rule we are dealing with series that are irregular, deficient in numbers, more or less impure, and hence complicated in composition. Mathematically sufficient and racially pure series are almost hopeless to expect, even when we deal with large numbers of living people. The tasks of the anthropologist therefore will always be essentially analytic—and analytic in the physiological rather than in the purely mathematical way. It must further be borne in mind that in Physical Anthropology, more than in many other branches of science, a high-class yet simple exposition of facts, approachable by every educated person, is of so great an advantage that the matter of extensive use of algebraic formulæ in publication cannot be passed over lightly. Yet mathematical regulation of the curves of distribution, mathematical treatment of data bearing on variation, etc., are urgently called for and will necessarily prove of great utility. Thoroughly practical, sensible regulations of such nature should be one of the main objects of the international board above referred to. The whole matter demands early and most careful attention.

A supply of modern textbooks is still a pressing need. It is more than thirty years since Topinard⁸ gave us his great handbook which for a long while yet nothing will wholly replace. It is four years since another very comprehensive and valuable textbook appeared,

⁸ *Éléments d'Anthropologie générale*, Paris, 1885.

namely, that of Martin.⁹ But neither of these nor the two together are sufficient; and in English we have nothing of such a nature, not even in the way of a translation.¹⁰ The most urgent present need is not so much for a compilation of the results of anthropological work as for a compact, satisfactory handbook on anthropometry and methods in general.

An advance toward strictly specialized periodicals, to be devoted exclusively to Physical Anthropology, is merely an aim at a further step in differentiation, such as is manifested in all branches of research after having reached a certain stage of development. So far as America is concerned, this aim has now reached its realization. The writer has advocated the establishment of such a Journal since 1908. In 1916 he presented the proposal in definite form to the subcommittee on Anthropology of the Committee of One Hundred on Research of the American Association for the Advancement of Science, and it received the full approval of both the subcommittee and the committee. Late in 1917 this approval was seconded unequivocally by the Secretary of the Smithsonian Institution, the Committee on Anthropology of the National Research Council, and the American Anthropological Association. In view of this general approbation there is promise that the Journal will be well received and be soon on a permanent and really serviceable basis.

The importance of complete and continued bibliographical records of the results of Physical Anthropology is self-evident, and is an aim that calls for the earliest possible realization. Beginnings along this line have already been made, particularly in the matter of current literature, but the movement requires definite organization and extension to the older publications. Our ideal in this direction is a competently annotated bibliography, universal in scope, and liberal of inclusion.

Improvement in and generalization of information concerning collections in Physical Anthropology are highly desirable. Such information, furnished through periodically supplemented registers of newly acquired material, would greatly promote collaboration as well as the extent of research. An additional procedure of much consequence would be the deposit of smaller collections in the larger centers in each country, where they could be better cared for and become more easily

⁹ *Lehrbuch der Anthropologie*, Jena, 1914.

¹⁰ The English "Anthropology" by Topinard, London, 1879, 2d ed., 1890, is not equivalent to the French work.

available. These latter desiderata, while universal, apply with particular force to the United States and the New World, where our material is more homogeneous.

Finally, a matter of vital concern to Physical Anthropology is the continued augmentation and improvement of collections. It is requisite, particularly in this country, that our collections be supplemented in a systematic manner, and in all particulars. There are needed much additional osseous material, including all parts of the skeleton, for racial and other group studies; ample developmental series, on which may be determined racial and other peculiarities in all stages of growth; the largest possible acquisitions of skeletal remains from all periods of peoples known the longest to history, such as the Egyptians, Semites, Chinese, etc., for ascertaining the physical variations in different localities in known periods of time; large collections of brains, preserved by most approved and uniform methods, for the study of gross, minute, and chemical differences in that organ in definite groups of humanity; and substantial series of at least the skeletal parts and brains of the anthropoid and other apes for purposes of comparison. The existing material, as well as that to be added, should be cared for in the best possible manner with respect to identification, cleaning, repair, cataloguing, and preservation. A proper preservation of the skeletal remains is particularly important, as much of the material grows in value as time advances and region after region becomes exhausted of such remains. All these are necessities on the fulfilment of which further advance in Physical Anthropology depends directly. Other desirable objects, at least in our great museums, are series of specimens suitable for exhibition, for illustrating to the public the best authenticated evidences of man's evolution, at least, and the most generally interesting human variations; and we need also larger gatherings of photographs, as well as accurate casts and busts, and hair collections.

The above by no means exhausts what may be termed the internal needs and therefore aims of Physical Anthropology. There still remain the very important objects pertaining to the virile development and advance of teaching; the foundation of separate central institutes of Physical Anthropology for different countries, such as the *École d'Anthropologie* of Paris; the conservation of original, detailed data where they may be available for future use, etc. But these are largely matters of ultimate development of the branch, dependent on the progress realized along the lines before specified, hence their discussion may be deferred to another occasion.

This leads us to specific scientific aims of Physical Anthropology, which are innumerable. They extend from questions of pure science and natural philosophy to those of high practical utility, and from problems of local interest to those applying to all humanity. I shall pass briefly over the questions of a more general nature and conclude with those that are more especially American.

The paramount scientific object of Physical Anthropology is the gradual completion, in collaboration with the anatomist, the physiologist, and the chemist, of the study of the normal white man living under ordinary conditions. And our knowledge must not extend to the averages or mean conditions alone, but to the complete range of normal variation of every important feature of the human body, and to the laws governing their correlation. Such knowledge of the white race is eventually indispensable for anthropological comparisons. The goal, however, is still very distant, notwithstanding the results already accomplished. It is necessary to renew and to extend the investigations to every feature, every organ, every function of the white man, until these are known in every detail. The facility and value of all comparative work will increase in direct proportion to the degree of consummation of efforts in this direction. The choice of the white man for the standard is only a matter of most direct concern and convenience; the yellow-brown or the black man would serve equally well, if not better, were we of his blood and were he as readily available.

Another quite fundamental task of Physical Anthropology is to perfect, or aid in perfecting, the detailed knowledge of the structure, function, and, as far as possible, chemical composition of the primates, both living and fossil. This field of investigation is like the vestibule to the hall of man's natural history and is essential to the understanding of man's past and even present evolution. The remains of the fossil forms of the primates are unfortunately still few in number and very defective; nevertheless they are being gradually augmented, and the hope seems justified that in the not far distant future forms will be recovered that will be of as acute interest to the student of man's origin as the known remains of some of his earlier representatives. An intensive systematic search for such remains in Africa, Asia, and Malaysia is one of the most urgent scientific necessities.

The third great aim of our science is the perfection of knowledge of human phylogeny proper: knowledge, in other words, of the evolutionary changes and the variations in man's structure with respect to

time. This calls for a delicate, most thorough, and, so far as may be possible, an unbiased study of every human osteological specimen of geological antiquity, as well as that of ample series of the old remains of man of definitely known age; and of all the causes that may have been instrumental in the changes that led to and governed man's evolution. Research in connection with the bones of geological early man has been painstaking, but the specimens themselves are still relatively few in number and mostly very imperfect; while the study of man's variations and differentiation during the earlier parts of the period of which there is chronological knowledge and which is comprised within the last 8,000 years, is still almost in its infancy. When world conditions again become normal, the search for skeletal remains of early man will, it is strongly hoped, proceed with increasing vigor into new and promising areas, such as southeastern Asia, Asia Minor with the Arabian peninsula, and Africa. And it is hoped also that our archeological friends will no longer stand aloof, as so often in the past, but will collaborate with us to rescue not alone the evidences of man's activities but the precious skeletal remains encountered in their excavations of ancient historic sites. Such remains are capable of lending testimony for the solution of the most important problems of archeology, and, when properly correlated in point of time, as they can be in Egypt, Chaldea, and perhaps in Greece and other localities, they constitute material of the highest value to Physical Anthropology.

The next important object of Physical Anthropology is the continuous advance in the study of the more primitive human races and their subdivisions. What has already been accomplished in this field have been in large measure only the primary, the easiest steps; in fact we have not yet emerged here far above the stage of amateurism. In not a single instance can we say that we possess even a fairly complete record of any of the colored peoples. There are great territories in Asia, Africa, Oceania, and America, of whose populations our knowledge is hardly more than rudimentary; and there are many subdivisions of the white race itself which demand much more thorough investigation. We have more or less knowledge of the general features, and perhaps of the skulls, of many peoples, but we know little of their other physical characteristics, of the full, exact range of the normal oscillation of these characteristics, of parts of the skeleton other than the skull, of the brain and other internal organs, of the periods of development and decline, and of their normal functions generally, although all such

knowledge is indispensable to our progress. It may not be of special benefit to the more primitive groups themselves, but we must have it not alone for descriptive and statistical purposes, but for a proper understanding of the fundamental problems of our own race and of humanity in general. The more primitive groups of people are less mixed, less abnormal, less pathological, perhaps less aberrant than those of more civilized communities, hence observations thereon may reasonably be expected to reveal more readily and clearly the workings of natural laws that control man's cycle of life, his adaptations, his changes, and his evolution.

Associated with racial studies, but of more direct and serious concern to many nations, particularly the American, are investigations into the physical, physiological, and intellectual effects of racial mixtures on progeny. Mixture of colored races with the white are largely controllable by law and general enlightenment, and if found detrimental could be reduced to a minimum. In the United States we are confronted on the one side with the grave problem of mixture of white and negro, and on the other with that of white and Indian. We know something of the general results of such miscegenations, but in both cases the subject calls urgently for more thorough investigation. A question of perhaps even greater concern is that of the immigration of whites of every extraction. What do these diverse strains bring in the way of physical and intellectual endowments, and what in these respects are the results of their mixture with the native population? These questions can be answered only by adequate medical, psychological, and anthropometric studies of sufficiently large groups of the immigrants of each class, and by similar investigations on their progeny, both pure and where they have mixed with Americans of other extraction.

The anthropological study of the child and the adolescent is also far from finished, even in this country and in Europe, where it has received most attention. Among primitive peoples this field, as already mentioned, is not only of great importance but is still almost virginal. The white child in future must be studied not only individually and separately as hitherto, but also in connection with its brothers and sisters and together with its progenitors. It must be studied even before birth, in which direction fortunately substantial progress has lately been made in this country.¹¹ The earlier and the later

¹¹ Under Dr. Frank P. Mall, whose recent untimely death is a severe loss to American anatomy and anthropology.

children of the same parents will probably repay special attention, and the subject of both hereditary and acquired pathological influences on the development of individual children must receive careful consideration.

Next in sequence are studies concerning the numerous environmental groups of humanity—groups developed and continuing under extremes of elevations, climate and nourishment; or under the greatest specialization in clothing, food, occupation, or habits, that are liable to permanently affect the body or its functions. All such conditions are followed by functional and structural reactions and accommodations of the system, and it is to be determined how these ultimately affect the progeny. Learning the exact facts here is beset with many difficulties, yet is feasible and the results are bound to be of much practical and scientific utility.

A still further extension of anthropological studies includes the pathological groups of mankind—the alcoholics, epileptics, insane, idiots, perverts, and other defectives or degenerates, and also criminals. This part of anthropological research is already fairly well advanced, and with the help of medical men has accomplished much of benefit to society. But the aims of science, which are a complete knowledge of these classes, are still far from having been attained. Their realization depends to a large extent on a perfect understanding of the normal contingent of the human and particularly the white family.

Finally, the ultimate aim of Physical Anthropology is that it may, on the basis of accumulated knowledge and together with other branches of research, show the tendencies of the actual and future evolution of man, and aid in its possible regulation or improvement.

The growing science of eugenics will essentially become applied anthropology. Progress in this direction stipulates, besides our other work, intensive studies in human heredity and of the principles governing its modifications. It also stipulates the necessity of perceiving and formulating the true goals of mankind, physical and intellectual, for the two are inseparable, and then working toward their realization.

A few words in conclusion regarding some of the more special duties of Physical Anthropology in this country and in the western continent in general.

American students, so far as it may lie in their power, should contribute to knowledge concerning the white race at large and of other peoples outside of this continent. They have already contributed in no small way to the study of child growth and should not stop in this

direction. Close attention and coöperation should also be given in all investigations concerning special, environmental, and pathological groups of humanity. There are a number of problems, however, which to American anthropologists will always be of special interest. These are the appearance and antiquity of man in America; the composition and detailed characteristics, with their normal range of variation, of the indigenous race, including the Eskimo; the development of the negro element; and the results of admixture of whites with the negro and the Indian. Alongside these range themselves parallel problems affecting the insular possessions of the United States.

Many of the above propositions are of course largely for the future. They may be presented now in a more or less general form, but we of this generation hope at best to advance the work of preparation. While this is in progress our efforts in the direction of eugenics, though by no means useless, must remain more or less empirical and impotent; therefore care should be taken not to create premature and unwarranted expectations.

The writer can not conclude without calling attention to a particularly important phase of anthropological preparation. This refers to national anthropometric surveys. The very existence of nations depends on the conservation of the physical standards and soundness of their people, and to gauge these standards nothing could be so effective as proper, sufficiently comprehensive, anthropometric surveys, made at definite, say fifty-year, periods. The need of undertakings of this nature has been steadily growing in the minds of both scientific and public consciousness for many years, and has led to more or less extensive attempts, preparations, or proposals in that direction in France, Italy, Germany, India, England, Denmark, Scandinavia, and during the Civil War even in our own country. Had not the war intervened, we would possibly have had in operation before now in England and Germany national surveys on a comprehensive scale; and the time can not be far distant when a national anthropometric (and perhaps psychometric) survey, as regular and useful as that of a national census, will be one of the permanent establishments of each civilized country. Such a survey would show what each nation represents biologically and what its tendencies are in this respect; and it would show what grade in the nation, from the physical point of view, the various social, environmental, and occupational groups represent, and where they are tending. The data gathered by successive surveys of this kind would then serve as an index

of progress, stagnation, or deterioration of and within the nations and thus afford indications of vital importance to agencies for eugenics, and for legislation. In the United States and in other parts of this continent such surveys will also indicate, as nothing else could, the results of the various racial mixtures. May the establishment of such a survey in this country not be too long delayed, for we should ead in this as in other directions.

THE PILTDOWN JAW

GERRIT S. MILLER, JR.

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From the time when its discovery was made known, in December, 1912, the Piltdown jaw has been a subject of controversy. It was at first described as part of the man whose fragmentary brain case had been found embedded in the same layer of Pleistocene gravel and at a distance of only a few feet. The individual thus formed was regarded as a dawn man, the representative of a genus *Eoanthropus* intermediate between modern man and the higher apes. Doubts were immediately expressed as to the propriety of this reassembling of the scattered remains, and they have never been entirely absent from any later discussion of the subject. In November, 1915, I published a detailed comparative study in which I reached the conclusion that the doubts were justified, and that there was no sufficient reason for treating the jaw otherwise than as that of a chimpanzee accidentally washed into proximity with a human skull. A year later, in an article printed in *Science Progress*, Mr. W. P. Pycraft adversely criticised these results and asserted that the jaw possessed so many human features that it could not be regarded as that of an ape. On account of the great interest aroused by these fossils¹ I have reexamined the subject with special reference to the new evidence put forward in *Science Progress*.² Before considering this evidence in detail it will be well to have a clear idea of the problem presented by the bones discovered at Piltdown, and an equally clear conception of the usual course of reasoning followed by paleontologists when dealing with fragmentary remains.

An imperfect mandible and parts of a human skull were found near each other in a deposit of river gravel. Bones and teeth of no less

¹ The bibliography relating to the original specimens now includes over 120 titles by more than 50 authors. The jaw has been called "the most startling and significant fossil bone that has ever been brought to light."

² My original paper, "The Jaw of the Piltdown Man," was published in the *Smithsonian Miscellaneous Collections*, vol. 65, No. 12, November 24, 1915. That in *Science Progress*, "The Jaw of the Piltdown Man: A Reply to Mr. Gerrit S. Miller," will be found in vol. 11, pp. 389-409, January, 1917. For brevity I shall refer to these two articles respectively as "Jaw" or "Original paper" and "Reply."

than six other mammals—beaver, horse, hippopotamus, rhinoceros, and two kinds of elephant—occurred at the same place, indicating that the ancient river bottom may have here formed a hole or pocket that acted as a collecting point for materials washed downstream. The discussion concerning this jaw and skull has assumed three main phases:

FIRST PHASE (1913).—The mandible was admitted to be almost precisely that of an ape, with nothing human except the molar teeth, which, however, approached the ape-pattern in their well-developed fifth cusp and elongated shape. It was nevertheless regarded as having formed part of the same individual as the skull. The animal to which this skull and mandible were supposed to have belonged received the generic name *Eoanthropus*. To the objection that such intimate association of the jaw and skull might not be justified, the reply was made that it could only be said that its [the mandible's] molar teeth were typically human, its muscle markings "such as might be expected," and that it was found in the gravel near the skull. Further arguments in favor of this association were based on the circumstance that such a combination of characters in one individual would accord with previously expressed opinions about the probable history of the skull in man. (Woodward, *Quart. Journ. Geol. Soc. London*, vol. 69, p. 135, April 25, 1913; Waterston, *Quart. Journ. Geol. Soc. London*, vol. 69, p. 150, April 25, 1913; Woodward, *Brit. Med. Journ.*, vol. 2 for 1913, p. 762, September 20, 1913; Smith, *Nature*, vol. 92, p. 131, October 2, 1913; Waterston, *Nature*, vol. 92, p. 319, November 13, 1913; Keith, "The Antiquity of Man," p. 459, 1915.)

SECOND PHASE (1915-16).—The characters of both the jaw and the teeth were regarded as not merely in a general way simian, but as definitely those of a chimpanzee. Certain features of the jaw were seen to be out of harmony with the skull, according to the associations of structures observed in all hitherto known primates. In the absence of conclusive evidence to prove that these previously unknown associations of structures had existed in one animal, each set of fragments was referred to the genus which its characters demanded. The name *Eoanthropus* was restricted to the human remains; the chimpanzee represented by the jaw was described as *Pan*³ *vetus*. (Miller, 1915; Matthew, 1916; Gregory, June, 1916, and July, 1916.)

³ According to the rules of the International Code of Zoological Nomenclature the generic names of the chimpanzee, gorilla, and orang are, respectively, *Pan*, *Gorilla*, and *Pongo*.

THIRD PHASE (1917).—The jaw has obvious peculiarities which make it human in spite of the fact that it presents many points of likeness to that of a chimpanzee. All supposed disharmony between the jaw and the skull is imaginary. The molar teeth are human; radiographs and other evidence show that they differ conspicuously from the corresponding teeth of all great apes. (Pycraft, 1917, with approval, p. 409, of Woodward, Smith, Keith, Underwood, and Broom.)

During the course of this discussion a well-known fact has not always been kept clearly enough in mind. This is that a paleontologist when dealing with fragmentary remains found in association is obliged to rely chiefly on one or the other of two fundamentally different courses of reasoning. In the one class of cases the fragments will show characters which may be regarded as mechanically related or unrelated to each other: a highly keeled breastbone in a bird is thus related to powerfully developed wings; a flat-crowned grinding upper tooth like that of an antelope is unrelated to a shear-edged cutting lower molar like that of a lion. In the second class of cases it is not possible to demonstrate mechanical relationship; the facts can be arranged on no other basis than that of observed associations. Teeth of a certain type have been observed to be characteristic of sharks. Hence the presence of these teeth in a deposit is accepted as indicating the occurrence of marine fishes with cartilaginous skeletons, though there is no known causal or mechanical relationship between sharks' teeth and sharks' skeletons, or between selachians and salt water. Horns like those of a cow or antelope have been so often found in mammals with cloven hoofs, and their absence is so conspicuous in all mammals with solid hoofs that there would be no hesitation in dissociating the horn of an unknown species of antelope from the toe of an unknown species of horse, however close the proximity in which two such fragments might have been discovered. Yet there is nothing in the known nature of animals to preclude the possibility that bony fish with teeth like those of sharks might exist abundantly in fresh water, or that the myth of the horned horse might one day become fact.

So long as the order of observed association continues unbroken it is recognized as the necessary basis of zoological reasoning in cases where sufficient other evidence is lacking. This procedure always leads to conclusions that are subject to revision with the finding of more ample material. In some cases, particularly when the known facts are not all remembered, it may give results that are the reverse of true, as on the occasion when Huxley, forgetting the pig, indorsed

Cuvier's statement that the track of a cloven hoof could be taken as the certain indication of the passage of a mammal with ruminant digestive organs.⁴ It is, however, the only rational method for handling incomplete facts. And as vertebrate fossils are more often incomplete than perfect it enters prominently into most of the generalizations of paleontology.

The Piltdown remains are eminently incomplete. The edges of the fragments of brain case are so injured that no two of the larger pieces can be exactly matched with each other (see especially the illustration by Professor Keith in "The Antiquity of Man," fig. 98, p. 304). The portion of the jaw by which it hinged with the skull is gone. Near the chin the mandible has been broken away "and abraded, perhaps when it lay fixed in the gravel and before its complete deposition" (Dawson, *Quart. Journ. Geol. Soc. London*, vol. 69, p. 121). Its outer face is "sufficiently disintegrated to show the constituent fibers of the bony tissue" (Woodward, *Quart. Journ. Geol. Soc. London*, vol. 69, p. 129). On its inner side it is better preserved, but the opening of the dental foramen has been accidentally enlarged. It is obvious that a decision as to whether or not the two sets of fragments belonged to one individual cannot be reached by any process of fitting the bones together. In order to be made part of the body of zoological knowledge the case must be treated by the method of observed associations of characters. If the skull has definitely human features it is to be regarded as human. And on this subject there has been no difference of opinion. Its whole structure proves it to be the skull of a man. If all parts of the mandible which have been found show a definitely simian structure this specimen presents characteristics which have never been seen except in jaws associated with simian skulls, such skulls differing noticeably from those of men. Under these circumstances the ordinary method of paleontology would be to treat the jaw as that of an ape. This course would be more positively indicated if the mandible possessed features which coincided with those of a known genus of anthropoids and if it lacked all characters which were diagnostic of man.

As I have already said, the jaw was at first admitted to be essentially that of an ape. The teeth were, however, regarded as human, though with strongly simian peculiarities. In the second phase of the controversy the ape-like features of both jaw and teeth were held

⁴ See Gill, *Science*, n. s., vol. 6, p. 235, August 13, 1897.

to be definitely those of the genus which includes the living chimpanzees. At the same time attention was called to certain apparent disharmonies between the jaw and the skull. Now, in the third phase, it is asserted that important and hitherto overlooked features of the jaw are positively human, and that the teeth are not only human but fundamentally unlike those of great apes.⁵ All supposed disharmonies between the mandible and the skull are denied. The method by which it is attempted to show that these disharmonies have not been proved to exist may be illustrated by passages in which some of the statements made in the original paper are compared with their treatment in the Reply.

1. **Original paper** (pp. 16-17): As a result of the maxillary retraction [in man] the nasal floor is shortened anteriorly and the nasal aperture is made to open directly forward instead of forward and upward. The nasal bones roofing this modified aperture are normally thrown into a prominence unknown in any monkey or great ape. . . . In the absence of a specimen showing human nasal bones coexisting with the protruding anterior maxillary region of the great apes, there is every reason to suppose that the Piltdown jaw was not closely associated with this pair of typical human nasals until the deposition of the remains near each other in the old river-bottom. **Reply** (p. 392): His contention that the nasals, which he agrees to accord to the Piltdown skull, cannot possibly be associated with this jaw, is, like the rest of his argument, but a crude deduction founded on false premises.

2. **Original Paper** (p. 18): On the evidence furnished by these characters the fossils must be supposed to represent: either a single individual belonging to an otherwise unknown extinct genus (*Eoanthropus*) or two individuals belonging to two now-existing families (*Hominidae* and *Pongidae*). The fossils are so fragmentary that their meaning will probably remain a subject of controversy. Yet the weight of the difficulties on the two sides is unequal. In order to believe that all the fragments came from a single individual it is necessary to assume the existence of a primate differing from all other known members of the order by combining a brain case and nasal bones possessing the exact characters of a genus belonging to one family with a mandible . . . possessing the exact characters of a genus belonging to another. Thus must be associated in a single skull: (a) one type of jaw with another type of glenoid region . . . (c) a high degree of basicranial adjustment to the upright position with absence of that corresponding modification of the lower jaw called for by all that is now actually known of the structure of the braincase and mandible in primates. **Reply** (p. 391): When Mr. Miller commits himself to the statement "Thus must be associated in a single skull: (a) one type of jaw with another type of glenoid region," he implies that there exists a relationship between the mandible and the glenoid cavity, which has no existence in fact. With the whole mammalian phylum to choose from he will seek in vain for data which will enable him to foretell, by an inspection of the glenoid cavity alone, what was the form

⁵ They are "as unlike chimpanzee teeth as teeth can well be." Keith, 1917, p. 85.

of the jaw articulating therewith. What Mr. Miller appears to mean is, that because the glenoid cavity of the Piltdown man is of the type characteristic of modern man, *therefore* the mandible must be in keeping therewith, that is to say it must possess a "chin," and must be horseshoe-shaped. This does not in the least follow . . . under heading (c) . . . he protests that it is impossible to associate in this skull "a high degree of basicranial adjustment, etc."

Nothing would be gained by pursuing this phase of the subject further. The argumentative part of the Reply demonstrates its writer's belief that the Piltdown jaw, skull, and canine belonged to one individual, but as an example of the application of the "standards of the paleontologist" called for on page 390 it is not convincing. It is particularly weakened by the prominence which it gives to details that are of secondary importance.⁶ Judgments as to disharmonies

⁶ The assertions with regard to some of these details are so ill-supported by the evidence of specimens that they require brief mention. As they have little if any direct bearing on the main question they are excluded from the text of this article.

(1) "The jaw of the Piltdown skull, applied to a recent human skull of the same length as the Piltdown skull—of a Torres Straits Islander in the British Museum, to be precise—projects, at the incisors, no more than 3 mm." (p. 391): The length of the Piltdown skull is not known; the assumed length of the jaw depends on the way in which the missing parts are reconstructed.

(2) Glenoid cavity shallow in lower human types (p. 392): Shallow cavities are occasional in all modern human types.

(3) The petrous portion of the squamosal in the Piltdown skull exceeds the length of the same part in modern skulls by no less than 10 mm. (p. 392): Its length in the fossil measured from the auditory meatus ($46 \pm \text{mm.}$) is equaled or exceeded in several skulls of Eskimos (Nos. 279655, 279663) and Mongolians (Nos. 278806, 278818, 278879) in the U. S. National Museum.

(4) Because the petrous portion of the squamosal is 10 mm. longer than in modern man the breadth of the skull in glenoid region was at least 20 mm. greater than in recent skulls (p. 392-393): Two whites (Nos. 244030, 244039) with length of petrous portion 40 and 41.5 have glenoid breadths (measured from the ridge at outer side of articulating surface) of 115 and 130 respectively; in a white (No. 244030) and Mongolian (No. 278806) with essentially equal glenoid breadth (130 and 131) the length of petrous portion is 41.5 and 48.8 respectively.

(5) "That the canine is *not* that of a chimpanzee is surely abundantly proved by the fact that it lacks all traces of the 'heel' . . . as well as of the cingulum" (p. 405): The heel and cingulum are not invariably obvious in the canines of recent chimpanzees, particularly in the upper teeth.

(6) "The cruciform valley, characteristic of the human molar, cuts the [grinding surface of the] crown into four subequal moieties: this is never the case with the chimpanzee molar; since when lines answering to these valleys are drawn across the tooth the transverse crosses the longitudinal axis obliquely" (p. 403): See Jaw, pl. 2, fig. 1', present paper, pl. 3, fig. 2'.

between the jaw and skull, and as to the characters of the canine tooth, seem likely to remain subject to individual opinion and experience; after these opinions have been expressed little more can profitably be said.

The one question now worthy of further elaboration is of such a kind that it must be answered through the study of specimens: Is it true that the jaw and teeth have no other characters than those which should be present in a member of the genus *Pan*, or have they, together with their obviously simian features, peculiarities which are unknown except in human beings? The features of the mandible which resemble those found in living chimpanzees have been described and figured in so much detail that they need no further demonstration. Regardless of varying opinions as to the relationship of the jaw to the skull, authors, almost without exception, have recognized that these characters required comparison with those of chimpanzees only, therefore not with those of orangs and gorillas. No one has seriously attempted to show that these features were ape-like in a merely vague and general way, and I have seen only one suggestion (Sergi, 1914) that they might indicate, by themselves, the existence of a peculiar genus; the resemblance to a definite one among the three types of living great apes has been too manifest.⁷ Originally the simian characters

⁷ See, for instance: Boule, *L'Anthropologie*, vol. 26, p. 60, April, 1915, vol. 28, p. 158, April, 1917; Gregory, *American Anthropologist*, vol. 18, p. 386, July, 1916; Keith, *The Antiquity of Man*, figs. 161, 162, 165 and throughout text of chapter 25; Pyecraft, Reply, throughout text, and especially p. 408: "That the Piltdown jaw does present many points of striking resemblance to that of a chimpanzee is beyond dispute;" Tomes, *A Manual of Dental Anatomy*, ed. 7, p. 586, 1914 ("The contour of the front of the mandible is exactly that of a young chimpanzee"); Underwood, *Brit. Journ. Dent. Sci.*, vol. 56, pp. 650-652, 3 plates ("The neck of the condyle in the fragment is identical in appearance, in thickness, and in strength with that of a young female chimpanzee The mylohyoid groove is exactly like the same groove in chimpanzee and quite unlike the same groove in any human mandible that I have seen. This groove is not a variable feature, but quite constant in man, gorilla and chimpanzee, so much so that it is quite easy to place any of these three types of mandible from an inspection of this groove alone. The coronoid process in its relation to the third lower molar is in the fragment exactly as in chimpanzee and a comparison of the two mandibles here shown [Piltdown and chimpanzee] renders the similarity of the temporal attachment obvious (pp. 651, 652); Waterston, *Nature*, vol. 92, p. 319, figs. 1-3, Nov. 13, 1913; Woodward, *Quart. Journ. Geol. Soc. London*, vol. 69, pp. 131, 133-134 (figs. 4-5), 136 (fig. 6); Woodward, *Quart. Journ. Geol. Soc. London*, vol. 70, p. 317, fig. 1 (symphyseal region of jaw compared with that in *Pan* and *Gorilla*).

of the mandible were regarded as of minor importance because of the association of the jaw with a human brain case as parts of one animal. Now they are so regarded because of the alleged presence of human features in the jaw itself. The belief that unquestionably human characters exist in the mandible is the most important element of the discussion in its present phase. The reasons for this belief are explained by the following eight statements taken from the Reply.³ Each statement will be accompanied by a criticism based on the material that I have examined.

(1) The molars of the Piltdown man, materially reduced as they are by wear, are still much more hypsodont than any chimpanzee teeth which I have seen, and this is true even if these worn teeth are compared with unworn chimpanzee teeth, which, by the way, are not, as Mr. Miller seems to suppose, of so uniform a character that observations made on one jaw will apply to all chimpanzee jaws (pp. 401-402).

In the accompanying table of measurements (page 34) the crown height of the Piltdown molars is compared with that in specimens of recent chimpanzees, of orangs, and of men. Hypsodonty is understood to be the ratio of crown height to maximum crown width. Mean hypsodonty is the mean of the ratios for outer and inner sides of the same tooth. Total hypsodonty is the average of all the ratios for both teeth. The measurements of the type specimen of *Pan vetus* were given me by Mr. Pycraft in a letter dated August 7, 1917. Concerning them he writes: "I have taken the measurements you ask for, but must remark that I cannot guarantee their absolute accuracy. I do not believe any two people measuring these teeth would arrive at exactly the same results, or even that exactly the same measurements would be given after any two attempts by the same person. However, you will find that mine accord, within 0.5 mm. of those given by Tomes in his Dental Anatomy. As to the height of the enamel I have given the maximum [when the lower border extends downward in a point at middle]." In measuring the teeth of the recent apes and men I have taken the height to the bottom of the notch between the cusps. This point, if it does not correspond exactly with the upper level of the crown in the Piltdown teeth, appears to correspond with it too nearly to introduce any serious error in the comparisons. Inspection of the table shows that the Piltdown teeth do not possess a degree of hypsodonty so marked that it demonstrates generic distinctness between

³ *Science Progress*, vol. 11, pp. 395-408. January, 1917.

the animal to which they belonged and living members of the genus *Pan*; much less would the conclusion be justified that these teeth are proved by the height of their crowns to be either doubtfully simian or unequivocally human. (Compare also the radiographs of the Piltdown teeth with the teeth of apes and men shown in plate 1.) In the first molar the mean hypsodonty is slightly greater (especially when measured from the enamel) than in the corresponding tooth in two African chimpanzees; in the second molar it is distinctly less, so that the total hypsodonty for the fossil, 62.8, lies between that for the two recent specimens, 57.1 and 63.4. Essentially similar conclusions result from the comparison of *Pan vetus* with the teeth of two orangs. Here again, except for the hypsodonty of the first tooth measured from the enamel,⁹ the fossil is in general exceeded by the recent specimens; total hypsodonty of the former 62.8, that of the two latter 63.4 and 68.2. In the human teeth the total hypsodonty ranges from 62.7, essentially the same as that in *Pan vetus*, up to 80.5. There is no doubt that the hypsodonty of the lower molars in *Homo* usually exceeds that in any of the known great apes; but the variability of this character which is shown by the four specimens measured proves that no reliance can be placed on crown height alone as demonstrating the human origin of any individual set of teeth, except when the total hypsodonty is above anything known to be present among the *Pongidae*. Such is conspicuously not the case with the hypsodonty of the Piltdown teeth.

(2) In the Piltdown jaw the protoconid, metaconid, and hypoconulid [the three tubercles on the outer side of the molars] are conspicuously larger than in those of the largest chimpanzee tooth, and these differences are still more marked in the case of the normally smaller teeth characteristic of the chimpanzee. Furthermore, the sulci dividing the cusps one from another are [in chimpanzees] longer, and far more conspicuously marked, than in any human teeth, including the teeth of the Piltdown jaw (p. 402).

That statement No. 2 fails to demonstrate any incongruity of cusp structure between the molars of *Pan vetus* and those of living members

⁹ The original figure of this tooth (*Quart. Journ. Geol. Soc. London*, vol. 69, pl. 20, figs. 2 and 2a) indicates that the enamel extends downward at middle in a point that adds about 0.5 mm. to the height on each side. The presence or absence of such points is an individual character in both men and apes. They do not occur in the chimpanzees and orangs whose measurements are given in the table. If 0.5 mm. be deducted from the height of the Piltdown tooth the mean hypsodonty becomes 54.5, only 1.3 greater than in *Pongo* No. 142202, and 3 greater than in *Pan* No. 176243.

FIRST LOWER MOLAR

NAME	NUMBER	LOCALITY	Width of crown	HEIGHT OF CROWN				HYPSONDONTY				TOTAL HYPSONDONTY OF M ₁ AND M ₂	
				From fork of roots		From base of enamel		From fork of roots		From base of enamel			
				Outside	Inside	Outside	Inside	Outside	Inside	From fork of roots	From base of enamel		Mean
<i>Pan vetus</i>		England	11.0	9.0	7.5	7.5	5.5	81.8	68.2	50.0	75.0	59.1	
<i>Pan</i> sp.....	84655	Africa	9.7	6.1	6.2	4.5	4.0	62.8	63.9	46.4	41.2	63.3	43.8
<i>Pan</i> sp.....	176243	do	9.5	7.1	6.7	5.2	4.6	74.7	70.5	54.7	48.4	72.6	51.5
<i>Pan</i> sp.....	176243	do	9.5	7.8*	7.8*	5.6*	5.8*	82.1*	82.1*	58.8*	61.1*	82.1*	59.9*
<i>Pongo</i>	142202	Borneo	10.9	9.1	7.2	7.0	4.6	83.5	66.0	64.2	42.2	74.7	53.2
<i>Pongo</i>	145320	do	11.6	11.2	10.0	9.2	6.0	86.2	79.3	51.7	47.4	82.7	49.5
<i>Homo</i>	2346	American white	10.3	9.9	10.0	7.1	4.9	96.1	97.1	68.9	47.5	96.6	58.2
<i>Homo</i>	278783	Mongolia	10.6	9.3	9.0	7.3	5.3	87.7	84.9	68.8	50.0	86.3	59.4
<i>Homo</i>	226107	New Britain	12.0	11.0	10.2	6.6	5.3	91.6	85.0	55.0	44.1	88.3	49.5
<i>Homo</i>	257546	East Africa	10.4	8.4	9.0	4.5	4.2	80.7	86.5	43.2	40.3	83.6	41.7

SECOND LOWER MOLAR

<i>Pan vetus</i>		England	8.0	7.0	7.5	4.5	69.5	60.8	65.2	39.1	65.1	52.1	62.8
<i>Pan</i> sp.....	84655	Africa	7.2	7.6	5.0	4.5	72.0	76.0	50.0	45.0	74.0	47.5	57.1
<i>Pan</i> sp.....	176243	do	8.1	7.4	5.6	5.1	80.2	73.2	55.4	50.5	76.7	52.9	63.4
<i>Pan</i> sp.....	176243	do	8.2*	8.7*	5.8*	6.4*	81.2*	86.1*	57.4*	63.3*	83.6*	60.3*	71.5*
<i>Pongo</i>	142202	Borneo	9.4	8.5	7.3	4.8	78.8	71.4	61.3	40.3	75.1	50.8	63.4
<i>Pongo</i>	145320	do	11.2	12.0	7.3	6.3	87.1	90.9	55.3	47.7	89.0	51.6	68.2
<i>Homo</i>	2346	American white	10.4†	11.2	7.5	5.6	100.0	107.6	72.1	53.8	103.8	63.4	80.5
<i>Homo</i>	278783	Mongolia	9.5	9.5	7.3	5.2	95.0	95.0	73.0	52.0	95.0	62.5	75.8
<i>Homo</i>	226107	New Britain	10.0	8.5	6.2	5.0	89.2	75.8	55.3	44.6	82.5	49.9	67.5
<i>Homo</i>	257546	East Africa	8.0	9.6	5.1	5.0	72.7	87.2	46.3	45.4	79.9	45.8	62.7

* To summits of tubercles.

† Estimated.

of the genus will be evident on comparison of the three sets of teeth shown in plate 3, figures 2', 2'', and 4'. Here photographs of the teeth of two individuals of living species (figs. 2' and 2'') are represented enlarged to the same length as a photograph of the fossil (fig. 4'). The degree of wear in the specimen at the left appears to be about the same as that in the fossil; that in the specimen at the right is decidedly less. The chipping away of the enamel at the antero-internal margin of the crown in the first molar of the right-hand specimen should also be noticed. When allowance is made for these differences in condition it will be seen that the outer tubercles in the Piltdown teeth are not relatively larger than those in the African chimpanzees and that the sulci dividing the cusps in all three specimens are of essentially equal length and distinctness. The tubercular structure of the fossil differs less from that of the chimpanzee's molars at the right than the teeth of the two recent animals differ from each other.

(3) The widest part of the crown, in the chimpanzee tooth, is immediately above the roots, the grinding surface being conspicuously less in diameter. In human teeth, including the teeth of the Piltdown jaw, the crown passes almost insensibly into the root, and is not perceptibly wider or longer at its base than at its grinding surface; the reverse is the case with the molars of the chimpanzee (p. 402).

Statement No. 3 should be read in connection with the figures of lower molars of apes (upper row) and modern men (lower row) in plate 1 of the present paper. It is evident that individual human teeth cannot always be identified by the characters of crown form supposed to be diagnostic (see especially figs. 16 and 17). In recent chimpanzees the enamel attains its full thickness in the region immediately above its lower border, so that it appears to terminate more abruptly than is usual in man, a peculiarity often as evident to touch as to sight (see pl. 1, fig. 5; the enamel is imperfect in fig. 6). In the Piltdown teeth there is no trace of this type of thickening. But the conclusion that these teeth therefore have a structure which is definitely human and not simian is made impossible by the fact that a gradual thickening of the enamel occurs not only in men but also in orangs (pl. 1, figs. 2 and 3; compare with figs. 12 and 13).

(4) It is idle indeed to pretend that the molars of the chimpanzee are indistinguishable from those of the Piltdown jaw. As Professor Keith has already remarked, radiographs of the Piltdown jaw show that they are of the typical "taurodont" type, therein differing conspicuously from the molars not only of the chimpanzee but of all the great apes (p. 402).

The radiographs are here reproduced on plate 1 (fig. 4). Comparison with the longitudinally cut teeth of chimpanzees (figs. 5 and 6) and oranges (figs. 2 and 3) shows that the Piltdown molars do not differ conspicuously in their internal structure from those "of all the great apes." They are, in respect to the form of the pulp cavities and the thickness of the lateral walls, very similar to one of the chimpanzees figured and not appreciably different from either of the oranges. Professor Keith correctly pointed out ("The Antiquity of Man," fig. 175 and accompanying text, pp. 474-477) that they resemble the cynodont teeth of modern men and not the taurodont molars found in the Neanderthal type. In some modern human teeth (fig. 9) the pulp cavity is deeper than in the Piltdown molars, in others (fig. 10) it is about the same, and in still others (fig. 13) it is much more shallow, surpassing in this respect the condition ordinarily present in chimpanzees.¹⁰ The dental peculiarities which the radiographs of the Piltdown molars bring to light¹¹ do not demonstrate the existence of any character at present known to be diagnostic of the family *Hominidæ*.

(5) Not the least characteristic feature of the worn surface of the teeth [in chimpanzees] is the extreme thinness of the enamel, wherein they differ most emphatically from the teeth of the Piltdown jaw and from modern human teeth. Yet, curiously enough, Mr. Miller brushes this point aside as of no importance (p. 403).

¹⁰ While the height of the pulp cavity in the molars decreases with advancing age (see especially Lyne, 1916), there is evidently much individual variation as well. It seems not impossible that the width of the cavity in modern men may be found to be an average racial character. Dr. Emlyn J. Britton has lent me 36 radiographs recently made during the course of his dental practice among the whites of Washington. All represent the lower molars, and all show the type of structure seen in figures 9, 12 and 13 of plate 1; that is, the pulp cavity is relatively narrow (whatever its height) and the anterior and posterior walls of the tooth are relatively thick. The type shown by the Piltdown teeth, the modern great apes, and the Egyptian (fig. 10), with relatively wide cavity and narrow walls, I have not seen except in Egyptians and in some individuals of American Indians. No attempt has been made, however, to pursue the subject with special care.

¹¹ As to the bearing of the radiographs on the structure of the jaw itself Professor Keith writes: "When the architecture of the Piltdown mandible is revealed by the use of X-rays, the arrangement of the trabeculae and lines of bone then seen within the mandible is reminiscent of the anthropoid rather than of the human form One must admit that in its finer structure the Piltdown mandible has more in common with the anthropoid than with the human mandible" (The Antiquity of Man, p. 437). See Lyne, 1916, for a different opinion as to the evidence of the trabeculae.

In the original paper (p. 4) I said: "While the thickness of the enamel is usually greater in *Homo* than in *Pan*, individual variation in both genera is sufficient to make this character, taken by itself, of little diagnostic value. The cast and Dr. Woodward's figures indicate that the Piltdown teeth have enamel differing in no essential feature from that of *Pan* No. 84655." The variability in thickness of the enamel in human teeth can be appreciated on comparison of figures 11 and 12 of plate 1. That a difference in thickness does not constantly exist between enamel of chimpanzees and men is shown by figures 5, 12, and 13 of the same plate. The apparent similarity of the enamel in the Piltdown molars to that of the African chimpanzee No. 84655 may be seen by comparing figure 4' of plate 3 with figure 2' of the same plate and figure 7 of plate 1.¹² There appears to be no reason to modify the assertion that the characters of the enamel are not sufficiently positive to lead to definite conclusions.

(6) The Piltdown jaw more nearly resembles that of the Kaffir than that of the chimpanzee (p. 395).

Statement No. 6 is not easily understood. On plate 2 of the present paper the Piltdown jaw (fig. 2) is compared with the jaw of a Kaffir (fig. 3) and that of a chimpanzee (fig. 1). Even if, as the context (Reply, p. 395) may indicate, the resemblance to the Kaffir is not supposed to extend beyond the ascending ramus the difficulty in discovering any feature which would justify the conclusion is scarcely lessened. The angular region in the fossil is more broadly rounded and less backward-projecting than in the particular chimpanzee figured, but this character is variable in the recent animal. Furthermore, the photograph of the fossil published in the Guide to the Fossil Remains of Man in the British Museum (pl. 4, fig. B) makes the edge of the bone appear to be imperfect along the most strongly convex portion. The main point to be emphasized here is that the posterior half of the Piltdown mandible when viewed from the side presents no features so positively human that their importance overbalances the simian characters of the anterior half.

¹² This last figure shows the first left lower molar viewed partly from the side to demonstrate the flatly worn crown surface. That the flatness of the crown in the Piltdown molars lacks much of the importance that has been attributed to it was pointed out by Professor Underwood in 1913. He says: "It has been suggested that the flat worn surface of the two molar teeth is inconsistent with a raised canine. This assumption is wholly incorrect. Worn molars quite as flat as those of the Piltdown mandible are found in orang" (*Brit. Journ. Dent. Sci.*, vol. 56, p. 651. October 1, 1913).

(7) Two points of paramount importance in the conformation of the Piltdown jaw have been entirely overlooked by Mr. Miller. The first of these concerns the conformation of the inner surface of the body of the jaw. In chimpanzees this shows very striking differences, forming, when extremes are compared, two well-marked types. In the one the inter-ramial area, from the symphysis backwards as far as the level of m_2 , has a curiously inflated appearance, so that the teeth seem to arise from a cushion-like bed In the other this inner wall may dip downwards from the teeth almost as abruptly as in human jaws. But even here the differences between the human and the chimpanzee jaw are readily apparent, since in the chimpanzee this inner wall shelves downwards, and inwards, towards the symphysis As to the actual symphysis in the Piltdown jaw no positive statements can be made, but there can be no possibility of doubt about the human character of the whole region in question which has been preserved. Mr. Miller's photographs of the inner aspects of the jaws, which he uses to demonstrate the community of descent between the owner of the Piltdown jaw and modern chimpanzees, succeed only in demolishing the theory which he has been at such pains to elaborate. For one can see at a glance, by the high lights, which are the jaws of chimpanzees and which is the human—Piltdown—jaw. Between the two extremes seen in the jaws of chimpanzees every gradation will be found, but in no case would there be any possibility of confusing the Piltdown fragment, or any similar fragment of a modern human jaw, with similar fragments of chimpanzee jaws. This character alone suffices to demolish the whole of Mr. Miller's arguments (pp. 406-407).

Statement No. 7 is to be read in connection with figures 18-25 of plate 1. Here are reproduced photographs of a series of sections of casts which illustrate the form of the mandible in chimpanzees and men at the region where "in no case would there be any possibility of confusing the Piltdown fragment, or any similar fragment of a modern human jaw with similar fragments of chimpanzee jaws." The sections are made to include the first molar and are viewed from behind and slightly from the inner side. They show that this region of the jaw has no characters that are so sharply diagnostic between men and apes that identification can invariably be made on the basis of a single individual. Some human jaws (figs. 22 and 23) have a form that is probably never present in an ape, while others (fig. 25) might be regarded as simian if this character alone were considered. The Piltdown jaw (fig. 21) at the level of the first molar more nearly resembles the average of the chimpanzees (figs. 18-20) than it does the average of the men (figs. 22-25).¹³ I have been unable to find any

¹³ This conclusion is equally true when these figures of Piltdown and modern chimpanzees are compared with the five sections of human mandibles (representing Bushman, Fijian and New Caledonian) published by Prof. Arthur Thompson in the *Journal of Anatomy and Physiology*, vol. 50, p. 69. October, 1915.

features of cross section in this region that make it definitely human. The peculiarities of the high lights on the photographs published in plate 1 of the original paper are alluded to in the Reply almost as if they were family characters. They are due to differences in the pigment used in finishing the casts.

(8) But there is yet another test as to the human character of the Piltdown jaw which I venture to think is the most convincing of all If, in the jaw of a chimpanzee, a line be drawn down the middle of the tooththrow from the canine backwards, and another be drawn through the ascending ramus entering by the posterior border and passing out through the anterior border, it will be found that the two lines converge *in front* of the canine. If these lines be drawn along the tooththrow, and through the ascending ramus, of the jaw of a modern man they will be found to converge at a variable distance behind the articular condyle of the jaw; they may in rare cases run parallel, but in no case have I yet found them converging in front of the canine as in the chimpanzee. The Piltdown jaw agrees with that of modern man (fig. 4) The fact, then, that the Piltdown jaw in this regard agrees with the modern human jaw suffices to show that in the arrangement of its teeth, and in the form of the enclosed lingual space, it differed as widely from that of the chimpanzee as does the man of today The human character of the Piltdown jaw, judged by this test, is unmistakable (pp. 407, 408).

The last and most convincing test as to the human character of the Piltdown jaw depends on the relationship between two straight lines. One of these lines indicates the direction of the tooth row from the canine to the last molar, the other indicates that of the upper part of the ascending ramus. When extended forward the lines are to converge in all chimpanzees; they are to diverge (or in rare instances to run parallel) in all men, including the man of Piltdown. In a footnote (Reply, p. 407) it is explained that: "The line through the ascending ramus can best be taken by means of a straight edge held immediately above the sigmoid notch, but not necessarily over the tip of the coronoid process, which, both in man and apes, may be deflected outwards." This method does not give results that are sufficiently uniform for critical discussion. The required accuracy can be more nearly approached by fastening pieces of wire to the fore and hind borders of the ramus at a level immediately beneath the lowest part of the sigmoid notch. The wires are easily attached by means of small lumps of modeling clay; and by a process of "sighting" they can be made to take the position of the extended ends of the axis. Still greater accuracy may be attained by making a horizontal section of the ramus about 3 mm. below the notch. The form

of the jaw at the region in question is then perfectly displayed. When the mandibles of many individuals are examined by means of these more accurate methods it is seen that the character in question furnishes no "test" by which the nature, simian or human, of a single specimen can always be determined. In the great apes the lines usually converge anteriorly. This is particularly true of male individuals, in which the large canine causes the line of the tooth row to swing outward toward the line of the ascending ramus. In females the smaller canine allows the dental line to take a somewhat different course, so that anterior divergence is not uncommonly seen in chimpanzees, orangs, and gorillas. In human jaws the lines usually diverge anteriorly, though they are sometimes parallel, and I have found, in the course of an hour's search, six specimens (North American white, No. 2346; Chinese, No. 255155; Delaware Indian, No. 285304; Egyptian, No. 256420 c 2; Egyptian, No. 256420 y; Peruvian, No. 293971) in which they converge, though not to the degree ordinarily seen in anthropoids with large canines. The extreme phases of convergence and divergence may probably be regarded as diagnostic respectively of apes and men. There is, however, a wide area of overlapping; and no individual whose characters lie within this area can be identified by the relationship of the two lines under discussion. How completely the characters of the Piltdown jaw fall within this area is shown by the photographs in plate 3. The lines in the fossil, though slightly converging, are approximately parallel, while those in the orang, the African chimpanzee, and the gorilla noticeably diverge. The range of individual variation in the three recent apes extends from the condition shown in the photographs to one in which the lines cross each other immediately in front of the canine,¹⁴ while that in man extends from a degree of divergence greater than that in the gorilla to one of convergence decidedly more marked than is seen in the Piltdown jaw. Hence the relationship of the lines in the fossil does not indicate the existence of a structure peculiar to man.

In the foregoing nine pages I have analyzed the eight features of the Piltdown jaw which have been alleged to demonstrate the existence

¹⁴ The jaw of a chimpanzee with the lines converging in this manner is figured in plate 4 of the original paper. Comparison with the human jaw shown in the preceding plate indicates that the divergence usually present in man is due to the recession of the canine toward the sagittal plane rather than to any change in the structure of the ascending ramus.

of a structure which is definitely human. The evidence of specimens shows that these characters do not supply the basis for such a demonstration. Not one of the eight is human in the diagnostic sense in which the Piltdown brain case, temporal and nasals are human. That certain peculiarities of this mandible, and among them six of the eight features under discussion, resemble those to be found in some human jaws need not be questioned; but it is equally true that these same characters occur in the jaws of anthropoids. They therefore do not conflict with the features of the fossil which are admittedly unknown except in apes.

Under ordinary circumstances the evidence of neutral characters would not be allowed to outweigh that of definitely simian features like those which are obvious in the Piltdown jaw and teeth. No reason for following a different course in the present instance has yet been advanced in a convincing form. Of those that have been suggested the one which carries most weight is based on the improbability that the first trace of a primate representing a group not hitherto known in the Pleistocene of Europe should have been found within a few feet of complementary parts of an unusual human brain case. In regard to the force of this argument there exists no unanimity of opinion. Professor Smith remarks that the improbability in question, involving as it does "an upheaval of paleontological teaching," "is so enormous as not to be set aside except for the most definite and positive anatomical reasons" (February, 1916, and May 25, 1916). On the other hand, Professor Wright says: ". . . . now that we learn from Professor Keith's reconstruction of *Eoanthropus* that the cranium falls within the range of human variation, we have only to suppose that, with parts of Man was found part of an unknown anthropoid ape—after all, surely not a very high flight of imagination and further, it was quite time that representatives of our modern anthropoid apes were appearing" (August, 1916). Finally Dr. Matthew, considering the facts by the light of his many years' experience in collecting vertebrate fossils, regards the argument from contiguity in a layer of river gravel as "quite too slight to outweigh any contrary evidence, and certainly not adequate to base on it the erection of a new type of primate combining characters hitherto found dissociated in distinct generic types" (June 16, 1916). Such divergences of view indicate that no definite conclusion can be based on the fact that the fragments were found near together.

New material may prove that *Eoanthropus* is a valid genus;¹⁵ but neither the original fossils nor the circumstances of their deposition have yet been shown to demonstrate the existence of such a creature as *Eoanthropus dawsoni* was at first supposed to be.

One further indication of the agreement of the fossil with the jaw of recent chimpanzees may here be recorded. Professor Underwood has called attention to the symmetry which exists between the fossil and the opposite half-mandible of a chimpanzee;¹⁶ but I do not know

¹⁵ On February 28, 1917 Dr. Smith Woodward read before the Geological Society of London a paper entitled: Fourth Note on the Piltdown Gravel, with evidence of a Second Skull of *Eoanthropus dawsoni*. The full text of this article has not been received. From an abstract published in *Ann. and Mag. Nat. Hist.*, ser. 8, vol. 19, p. 483, June, 1917, the following passage may be quoted: "In the winter of 1915 the late Mr. Charles Dawson discovered in a ploughed field, about a mile distant from the original spot, the inner supraorbital part of a frontal bone, the middle of an occipital bone, and a left lower first molar tooth, all evidently human. These are rolled fragments, and the first and third may be referred with certainty to *Eoanthropus dawsoni*; but it is doubtful whether they represent more than one individual. In mineralized condition they agree with the remains of the type specimen. The piece of frontal bone exhibits the characteristic texture and thickness, with only a very slight supraciliary ridge, and a small development of air-sinuses. The occipital bone is somewhat less thickened than that of the original specimen of *Eoanthropus*, and bears the impression of a less unsymmetrical brain. The external occipital protuberance is a little above the upper limit of the cerebellum, as in Neanderthal man; thus differing from the condition both in *Eoanthropus* and in modern man. The lower molar is exactly similar to the first lower molar of *Eoanthropus* already described, but is more obliquely worn by mastication. Detailed comparison shows that this tooth is human, differing essentially from that of a chimpanzee in its more hypsodont crown, thicker enamel, and less prominence of the neck over the root. The occurrence of the same type of frontal bone with the same type of lower molar in two distinct localities, adds to the probability of their belonging to one and the same species." Through the kindness of Prof. Henry F. Osborn I have been permitted to examine a proof of the plate illustrating Dr. Smith Woodward's paper. The tubercles of the newly described tooth as there represented appear to be those of a definitely human molar. The hypsodonty, as nearly as it can be calculated from the drawings, is as follows: from fork of roots (outside), 92.1; from fork of roots (inside), 86.2; from margin of enamel (outside), 73.5; from margin of enamel (inside), 55.8; mean from roots, 89.1; mean from margin of enamel, 64.6. By comparison with the table on page 34 it will be seen that these heights are decidedly greater than in the first molar of the Piltdown jaw and that they are above the mean of variation in the human teeth.

¹⁶ "The half mandible of a chimpanzee when joined to the fragment shows exactly the same curve" (1913, p. 651).

that any one has specially examined the relationship between the fossil jaw and a recent chimpanzee's skull. Plate 4 contains two views of such a skull. In figure 1 the skull bears a cast of the Piltdown jaw, in figure 2 a cast of its own jaw mutilated like the fossil. Although photographs of this kind do not furnish conclusive evidence they show that the two mandibles are in many ways as nearly equivalent as could be expected in specimens representing distinct species. This plate also serves to illustrate the correspondence between the Piltdown canine and the left upper tooth of an African chimpanzee. In figure 1 the fossil (cast) is substituted for the original; in figure 2 the alveolus bears its own tooth. Except for the greater height of its crown the fossil tooth is symmetrical with the right canine of the recent animal, while with regard to the tooth row of the left side it assumes the same relationships as the canine which actually grew in the socket where the cast has been placed.

SUMMARY.—A jaw bearing the first and second molars was found embedded near parts of a human brain case in Pleistocene river gravel at Piltdown, Sussex, England. The combined characters of the jaw, molars, and skull were made the basis of a genus *Eoanthropus*, placed in the family *Hominidæ*. Later a pair of human nasals and an ape-like canine were discovered in the same gravel pit. Both were referred to *Eoanthropus*. While the brain case is human in structure the jaw and teeth have not yet been shown to present any character diagnostic of man; the recognized features in which they resemble human jaws and teeth are merely those which men and apes possess in common. On the other hand the symphyseal region of the jaw, the canine tooth, and the molars are unlike those known to occur in any race of men. Their peculiarities are such as have been found in the great apes only. Until the combination of a human brain case and nasal bones with an ape-like mandible, ape-like lower molars, and an ape-like upper canine has actually been seen in one animal, the ordinary procedure of both zoology and paleontology would refer each set of fragments to a member of the family which the characters indicate. The name *Eoanthropus dawsoni* has therefore been restricted to the human elements of the original composite (family *Hominidæ*), and the name *Pan vetus* has been proposed for the animal represented by the jaw (family *Pongidæ*). As the result of recent study the generic features of the jaw and teeth have not been shown to differ from those of living African chimpanzees; but the specific characters attributed to the Pleistocene British animal have been found to need expansion

(compare pl. 1, figs. 4, 5, and 6): first and second lower molars probably differing from those of recent African species in (a) slightly less brachyodont form, (b) slightly deeper pulp cavity, and (c) the absence of abrupt thickening of the enamel above its lower edge.

BIBLIOGRAPHY

(Supplementary to that in original paper)

ANONYMOUS. [Notice of recent publications on the Piltdown skull] *Nature*, vol. 97, pp. 309-310. June 8, 1916.

Concludes: "We are of the opinion that all three specimens [skull, jaw, canine] are . . . parts of one individual or at least of individuals of one species." "If mankind has been evolved from an anthropoid stock the occurrence of a combination of human and anthropoid characteristics in earlier or dawn human forms, such as occur in *Eoanthropus*, is just what we ought to find" (p. 310).

AVEBURY, LORD. *Prehistoric Times*, 7th ed., pp. 1-623, text figs. 1-283. New York and London, 1913.

Piltdown man, p. 337. "The lower jaw, if found by itself, would certainly have been referred to an anthropoid ape"

BARRELL, JOSEPH. Probable relations of climatic change to the origin of the tertiary ape-man. *The Scientific Monthly*, vol. 4, pp. 16-26. January, 1917.

"Most unexpectedly, however, a jaw of a chimpanzee has been unearthed from the Pleistocene of England in association with the Piltdown human cranium, *Homo dawsoni* The careful anatomical study by Miller seems to show that the remains of a chimpanzee had accidentally become mixed in the same deposit with the remains of man" (p. 21).

BOULE, M. Studies on the evolution of Primates. *L'Anthropologie*, vol. 28, pp. 157-159. April, 1917.

Review of Gregory, June 16, 1916. *Eoanthropus*, p. 158. The jaw is that of a chimpanzee. "Quelques paragraphes sont consacrés à la mâchoire de Piltdown, qui est celle d'un Chimpanzé auquel le mammalogiste américain Miller a donné le nom de *Pan vetus*. Dans un appendice, l'auteur veut bien rappeler que j'ai, de mon côté, insisté, dès le début, sur la ressemblance étroite de toutes les parties de la mandibule de *Eoanthropus* et de la mandibule d'un Chimpanzé, au point que je suggérais pour cette mâchoire le nom de *Troglodytes dawsoni* (*Pan* est le nouveau nom de genre adopté par les Américains, sans aucune raison sérieuse, pour le genre Chimpanzé)." Professor Boule intimates that he proposed for this animal a name which would antedate *Pan vetus*. In the passage to which he alludes (*L'Anthropologie*, vol. 26, p. 60, April, 1915) he merely says that if the mandible had been found alone it would certainly have been called *Troglodytes dawsoni*—" . . . si cette mandibule avait été trouvée seule . . . on n'eût pas manqué de l'appeler *Troglodytes dawsoni* . . ."—a remark which cannot be regarded either as establishing a new specific name for the mandible or as restricting the *dawsoni* of Smith Woodward to the jaw.

BOULE, M. The Jaw of Piltdown Man. *L'Anthropol gie*, vol. 28, pp. 433-435, October, 1917.

Review of Miller, 1915. Accepts conclusion that the jaw is that of a chimpanzee.

DAWKINS, BOYD. The antiquity of man and the dawn of art in Europe. *Edinburgh Review*, vol. 224, pp. 80-98. July, 1916.

Account of *Eoanthropus* p. 91, chiefly from Woodward, Guide to the remains of fossil man in the British Museum.

DIXON, A. F. Note on the fragment of the lower jaw from Piltdown, Sussex. *Nature*, vol. 99, p. 399. July 12, 1917. (Abstract of paper read before Royal Dublin Society, June 26, 1917.)

"The author believes that it is possible to reconstruct the lower jaw on more distinctly human lines than has been proposed hitherto. It does not seem necessary to assume that there was complete absence of chin, or that the Piltdown man belonged to a genus different from modern man, or that he may not have represented an early race of *Homo sapiens* from which modern man has been derived."

GIUFFRIDA-RUGGERI, V. L'uomo attuale una specie collettiva, pp. I-VIII, 1-192, pls. 1-13, text figs. 1-3. Milano-Roma-Napoli, 1913.

Eoanthropus, pp. 120-121. Quotes published opinions, but avoids adding anything new to the discussion.

———. La successione e la provenienza delle razze Europee preneolitiche ei pretesi Cro-Magnon delle Canarie. *Revista Ital. di Paleont.*, vol. 22 (1916), pp. 59-67. March 28, 1917.

Primarily a review of Osborn, 1916. *Eoanthropus*, pp. 59-61. Difficult to reconcile the characters of the jaw and skull. "Le riserve sulla posizione antropologica di Piltdown sono molto giuste, ed a me sono sempre apparse tanto più giustificate quanto più era visibile lo sforzo—e direi la virtuosità anatomica—di conciliare la scatola cranica di '*Homo evoluto*' e la mandibola scimmiesca (trovata a qualche distanza), nonchè il canino" (p. 61).

GREGORY, WILLIAM K. Studies on the evolution of the Primates, parts 1 and 2. *Bull. Amer. Mus. Nat. Hist.*, vol. 35, pp. 239-355. June 16, 1916.

Pan vetus, pp. 313-320. "I consider that Mr. Gerrit S. Miller has practically demonstrated that the Piltdown lower jaw represents a Pleistocene species of chimpanzee and that it did not belong with the associated braincase" (pp. 315-316).

———. Note on the molar teeth of the Piltdown mandible. *Amer. Anthropol.*, n. s. vol. 18, pp. 384-387, fig. 47. July-September, 1916.

"I recognize that . . . Mr. Miller's illustrations furnish a demonstration of the generic identity of the Piltdown jaw and the chimpanzee jaws there figured" (p. 384). See Pycraft, 1917.

HOOTON, E. A. The evolution of the human face and its relation to head form. *Dental Cosmos*, vol. 58, pp. 272-281. March, 1916.

Piltdown skull, pp. 277-278, accepted as ". . . an entirely human braincase . . . and paradoxically enough associated with it a long, narrow and very simian jaw."

HOPSON, MONTAGU F. Discussion [of paper by Lyne]. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., pp. 58-60. February, 1916.

Degree of wear in Piltdown canine sometimes found in milk teeth. See Underwood.

HRDLIČKA, ALEŠ. The most ancient skeletal remains of man, 2d edition, pp. 1-63, pls. 41, text figs. 12. May 13, 1916.

Piltdown remains, pp. 13-20. "The writer's feeling is that none of the conclusions regarding the Piltdown find should as yet be accepted as final; they all need corroboration and further elucidation, which can only be furnished in the course of time by additional finds Until then all hypotheses relating to 'Eoanthropus' and the term itself must be regarded as more or less premature" (p. 20).

JOHNSTON, H. H. [Review of Osborn's *Men of the Old Stone Age*]. *The Geographical Journal*, vol. 48, pp. 349-350. October, 1916.

Remarks that the author ". . . . seems to be a little perverse in quoting the absurd suggestion that the Piltdown jaw and teeth do not belong to the Piltdown calvarium This quotation from Mr. Miller is the only weak point in the work under review."

KEITH, ARTHUR. Present problems relating to the origin of modern races. *The Lancet*, 1913, vol. 2, pp. 1050-1053. October 11, 1913.

Piltdown skull, pp. 1052-1053.

———. Discussion [of paper by Lyne]. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., pp. 52-55. February, 1916.

Canine tooth belongs with the skull and jaw. It is a right lower canine, "although there is now a school in America which places it as an upper canine tooth on grounds which I do not understand." Admits that the wear is unlike that in any lower canine which he has seen, but regards the peculiarities as due to the position the tooth must have occupied in a jaw half way between that of ape and man.

———. Lo schema dell'origine umana. *Revista di Antropologia*, vol. 20, No. 17, pp. 1-20, figs. 1-5. October, 1916.

Piltdown man, pp. 17-18. If the Piltdown type represents a distinct genus, equal rank should be assigned to the Neanderthal type and to modern man. For the present it is safer to speak of types than of genera.

———. Men of the Old Stone Age [review of Osborn]. *Man*, vol. 17, pp. 82-85. May, 1917.

Eoanthropus, pp. 84-85. "We must expect, if evolution be true, to find forms in which ape and human characters are reproduced in various combinations" (p. 84). The teeth are "as unlike chimpanzee teeth as teeth can well be" (p. 85).

LANKESTER, RAY. The missing link. *Diversions of a naturalist*, chapter 30 (pp. 275-291), figs. 24-30 (mostly after Woodward); Preface dated June 16, 1915. (Previously published in *London Telegraph*.)

"The Piltdown jaw is the most startling and significant fossil bone that has ever been brought to light because this jaw and the incomplete skull found with it really and in simple fact furnish a link—a form intermediate between the man and the ape" (p. 284).

LYNE, W. COURTNEY. The significance of the radiographs of the Piltdown teeth. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., pp. 33-51, 60-61, figs. 1-7. February, 1916.

The pulp cavities show that the canine and the molars belonged to individuals differing greatly in age. The skull and jaw were parts of one individual but the canine is the lower milk tooth of an unknown "humanoid anthropoid." "If you look at the skiagram of the mandible you will find that the bony trabeculae are a much nearer approach to the Krapina man than those of the chimpanzee. In my opinion, the points which have shown Simian tendencies in this mandible have been magnified to the utmost possible extent, and the points which were typically human have only been brought in sufficiently to correlate, apparently, this mandible with the cranium."

MACCURDY, GEORGE GRANT. The man of Piltdown. *Amer. Anthropol.*, n. s. vol. 16, pp. 331-336, pl. XXX, text figs. 110-111. June, 1914 (Illustrations copied from Dawson and Woodward).

Review of subject to date.

———. The revision of *Eoanthropus dawsoni*. *Science*, n. s. vol. 43, pp. 228-231. February 18, 1916.

Review of subject to date. "During the month of December, 1915, the writer . . . examined the material on which Miller bases his conclusions, conclusions from which it would seem impossible for any one to escape who approaches the question with an open mind."

MATTHEW, W. D. Recent progress in vertebrate paleontology. *Science*, n. s. vol. 43, pp. 103-110 (with Eastman, C. R., and Gregory, W. K.). January 21, 1916.

Piltdown skull, pp. 107-108. "In the present reviewer's opinion Dr. Miller's argument is convincing and irrefutable; the jaw belonged to a chimpanzee and the skull to a species of man comparable to that represented by the Heidelberg jaw."

———. Note on the association of the Piltdown skull and jaw. *Bull. Amer. Mus. Nat. Hist.*, vol. 35, pp. 348-350. June 16, 1916.

"But the argument from association is quite too slight to outweigh any . . . contrary evidence, and certainly not adequate to base on it the erection of a new type of primate combining characters hitherto found dissociated in distinct generic types" (p. 350). See Smith, May 25, 1916.

MILLER, GERRIT S., JR. The jaw of the Piltdown man. *Smithsonian Miscell. Coll.*, vol. 65, No. 12, pp. 1-31, pls. 1-5. November 24, 1915.

MITCHELL, P. CHALMERS. An application of the rules of zoological nomenclature. *Nature*, vol. 96, p. 480. December 30, 1915.

"Thus if his [Miller's] opinion be sustained, the very famous Piltdown jaw, discovered by Mr. Dawson, made known to science by Mr. Dawson and Dr. A. Smith Woodward, and lodged in the British Museum, will have to be cited as the type of *Pan vetus*, Gerrit S. Miller."

MOIR, J. REID. Pre-Palaeolithic Man in England. *Science Progress*, vol. 12, pp. 465-474, January, 1918.

Piltdown individual, pp. 470-474. "Thus we find in this unique fossil a combination of human [cranial] and simian [mandibular] characters, such as have been looked for by evolutionists ever since Darwin first enunciated his famous theory regarding the ancestry of modern man" (p. 470). Age of the deposit probably Pliocene. Character of the associated flint implements could have been predicted from an inspection of Dr. Woodward's reconstruction of the Piltdown skull and jaw (p. 472).

NUTTALL, T. E. The Piltdown Skull. *Man*, vol. 17, pp. 80-82. May, 1917.

Deals with the reconstructions of the skull. "Professor Keith's estimate [of cranial capacity] is, I feel certain, much nearer the truth than either of Dr. Smith Woodward's" (p. 81).

OBERMAIER, HUGO. El hombre fosil. (Comisión de investigaciones paleontológicas y prehistoricas, Mem. No. 9), Madrid, 1916, pp. I-VII, 1-397, pls. 19, text figs. 122. Preface dated January, 1916.

Piltdown man, pp. 273-274, 297-299. Accepts Smith Woodward's views, but with evident doubt. "En vista de la novedad y importancia de las consecuencias que puede tener este hallazgo sería de gran interes el saber si la mandíbula y el canino pertenecen realmente a los restos del cráneo, pues de esta suposición depende la vitabilidad de esta nueva especie 'Eoanthropus'"

OSBORN, HENRY FAIRFIELD. Men of the Old Stone Age, pp. I-XXVI, 1-545, pls. 8, text figs. 268. November, 1915.

Eoanthropus, pp. 130-144. Accepts association of jaw with skull, but regards the canine as the left upper tooth.

———. Review of the Pleistocene of Europe, Asia, and northern Africa. *Ann. New York Acad. Sci.*, vol. 26, pp. 215-315. July 31, 1915.

Eoanthropus, pp. 286-287. "The placing of the skull and jaws together as belonging to one individual is not certain but is highly probable the superior canine tooth (mistaken by the authors for an inferior canine) resembles that of the anthropoid ape."

———. Men of the Old Stone Age, 2d edition. February, 1916.

In note X (p. 512) accepts the reference of the jaw to a member of the genus *Pan*.

PYCRAFT, W. P. Britain's oldest inhabitant. *Illustrated London News*, vol. 142, pp. 678-679, 7 text figures. May 17, 1913.

The author asserts that ". . . . sometimes a whole skeleton can be reconstructed from a single bone," and also that ". . . . the mastoid process and the articular surface for the lower jaw are absolutely different in man and the apes" (p. 678).

———. Discussion [of paper by Lyne]. *Proc. Roy. Soc. Medicine*, vol. 9, Odont., p. 58. February, 1916.

The Piltdown canine should be compared with the corresponding [lower] tooth of Torres Strait Islanders, Australians, or Tasmanians.

———. The jaw of the Piltdown man: a reply to Mr. Gerrit S. Miller. *Science Progress*, vol. 11, pp. 389-409, figs. 1-4. January, 1917.

"A very brief study of his [Miller's] arguments will show that they are based on assumptions such as would never have been made had he not committed the initial mistake of overlooking the fact that these remains—which, by the way, he has never seen—are of extreme antiquity, and hence are to be measured by the standards of the paleontologist rather than of the anthropologist. This unfortunate lack of the right perspective has caused him to overlook some of the most significant features of these remains, and has absolutely warped his judgment in regard to the relative values of the likenesses between these fragments and the skulls of the chimpanzee which he has so woefully misread" (pp. 390-391). "It will

be obvious, to those who will take the trouble to analyse the evidence where-with he supports his arguments, that he has endeavored, throughout, to confirm a preconceived theory; a course of action which has unfortunately warped his judgment and sense of proportion" (pp. 408-409). ". . . the likeness which seems to obtain between the form of the coronoid process and the sigmoid notch in the Piltdown skull and that of the two chimpanzees which he figures in his memoir . . . is so close that I venture to suspect that it is largely due to that process of "mutilation" to which he tells us he has submitted these jaws in order that they may be made comparable with the Piltdown jaw" (p. 394). See Gregory, July-September, 1916.

RUTOT, A. Quelques découvertes récentes relatives aux races humaines primitives. *Bull. Soc. Belge Geol., Proc.-Verb.*, vol. 27, pp. 5-6. 1913.

Regards the Piltdown man as the maker of the eoliths. "La découverte du Sussex a, comme on le voit, une importance capitale, car c'est bien l'Homme tertiaire (Pliocène), à industrie éolithique, qui est enfin parvenu à notre connaissance."

SCHUCHERT, CHARLES. A text-book of Geology, by Louis V. Pirsson and Charles Schuchert. Part 2, Historical Geology. 1915.

Eoanthropus, pp. 965-969, pls. 39-40. Accepts association of jaw with skull (account drawn principally from Sollas, 1915).

SERA, G. L. Un preteso *Hominida* miocenico: *Sivapithecus indicus*. *Natura*, vol. 8, pp. 149-173. 1917.

Eoanthropus, pp. 170-171. Accepts association of jaw with skull. The teeth, on account of their height, would perhaps be better compared with those of a primitive *Dryopithecus* than with those of a chimpanzee.

SERGI, G. La mandibola umana. *Revista di Antropologia*, Roma, vol. 19, pp. 119-168, numerous text figs. 1914.

Piltdown mandible, pp. 166-167. Accepts association of jaw with skull, and regards structure of symphysis as peculiar. 'Ma soltanto ad osservare il residuo del margine prossimo alla sinfisi e le curve verso l'esterno e l'interno, noi crediamo che questa mandibola sia differente da quelle altre o fossili o recenti, e quindi sia giustificata la denominazione dell'uomo cui apparteneva, di *Eoanthropus dawsoni*"

SMITH, G. ELIOT. Man of the dawn. *Sydney Morning Herald*, July 3, 1914, p. 9.

". . . if that [Piltdown] jaw had been found without any teeth, or if it had been found separate from the skull, no one would have hesitated to call it an ape's jaw." See Smith, 1917.

———. Discussion [of a paper by Lyne]. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., pp. 56-58. February, 1916.

"To bring a hitherto unknown ape into England in the Pleistocene period involves an upheaval of paleontological teaching."

———. New phases of the controversies concerning the Piltdown skull, *Proc. Manchester Lit. and Philos. Soc.*, vol. 60, pp. XXVIII-XXIX. May 25, 1916.

"In considering the possibility that more than one hitherto unknown ape-like man or man-like ape expired in Britain side by side in the Pleistocene period, and left complementary parts the one of the other, the element of improbability is so enormous as not to be set aside except for the most

definite and positive anatomical reasons. The author . . . emphasized the fact that the skull itself revealed certain features of a more primitive nature than any other known representative of the human family" (p. XXIX). See Matthew, June 16, 1916.

SMITH, G. ELLIOT. "Men of the Old Stone Age." *Amer. Mus. Journ.*, Vol. 16, pp. 319-325. May, 1916.

Review of Osborn. Piltdown skull, pp. 321-322. "But the acceptance of the view that the jaw is an ape's and the cranium a man's would involve the supposition that a hitherto unknown and extremely primitive apelike man, and an equally unknown manlike ape, died on the same spot, and that one of them left his skull without the jaw and the other his jaw without the skull. Not only so, but it would involve also the admission that an anthropoid ape was living in England in middle Pleistocene times . . ." See Wright, August, 1916.

———. The cranial cast of the Piltdown skull. *Man*, vol. 16, pp. 131-132. September, 1916.

Reply to criticisms by Symington and Wright.

———. The problem of the Piltdown jaw: human or sub-human? *Eugenics Review*, vol. 9, p. 167. July, 1917.

Review of Pycraft, 1917. "By means of the large collection of data relating to details of the anatomy of the teeth and jaws of chimpanzees and men he has proved quite conclusively that the Piltdown jaw . . . belonged to a primitive member of the human family . . ." See Smith, July 3, 1914.

SPURRELL, H. G. F. Modern man and his forerunners, pp. I-XXII, 1-192, pls. 1-5, text fig. 1. London, 1917.

Piltdown man, p. 44 and pl. 5. "The Piltdown man, though by far the most ape-like of human remains yet found, has much in common with modern man . . . while he certainly has no place in the direct line of Neanderthal man's descent."

SYMINGTON, J. On the relations of the inner surface of the cranium to the cranial aspect of the brain. *Edinburgh Medical Journal*, vol. 14, pp. 85-100, figs. 1-21, February, 1915.

Piltdown skull, pp. 92, 99-100. "It is unfortunate that the facts they [endocranial casts of prehistoric skulls] reveal are so few in number and so lacking in precision, but it is surely better to admit frankly the limitations of our knowledge than to reconstruct primitive brains on such slender data" (p. 100).

———. Endocranial casts and brain form: a criticism of some recent speculations. *Journ. Anat. and Physiol.*, vol. 50, pp. 111-130. January, 1916.

Eoanthropus, pp. 122-129. Concludes: "That the various deductions made by . . . Elliot Smith and others with reference to the primitive and simian features of the brains of certain prehistoric men, from an examination of their endocranial casts, are highly speculative and fallacious" (p. 130).

THACKER, A. G. [Notice of Miller, 1915] *Science Progress*, vol. 10, p. 648. April, 1916.

"The case for the dissociation . . . could hardly be better stated . . . and nobody can reasonably deny that some doubt exists."

TOMES, CHARLES S. A Manual of Dental Anatomy, ed. 7, pp. I-VI, 1-616, figs. 1-300. 1914.

Eoanthropus, pp. 586-588. "There is doubt whether it is justifiable to create a new genus for this man . . . hence . . . the name should be rather *Homo piltdownensis*" (p. 586). "The contour of the front of the mandible is exactly that of a young chimpanzee. The [molar] teeth, however, are quite human (p. 586)."

UNDERWOOD, ARTHUR. Discussion [of a paper by Lyne]. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., pp. 55-56.

Canine tooth too much worn to be a milk tooth. It has suffered "huge removal of tissue by the wear of the upper canine." (See Hopson.)

WATERMAN, T. T. Evolution of the chin. *Amer. Nat.*, vol. 50, pp. 237-242 figs. 1-7. April, 1916.

Eoanthropus, fig. 3. Regards formation of chin as the result of dental retraction.

WINCHELL, NEWTON HORACE. The antiquity of man in America as compared with Europe. *Bull. Minnesota Acad. Sci.*, vol. 5, pp. 121-151, figs. 1-20. May, 1917.

Piltdown skull, pp. 126-127. "In all respects, so far as the specimens can be interpreted, the Piltdown man and the Heidelberg man are nearly allied, almost identical" (p. 126).

WISSLER, CLARK. "Men of the Old Stone Age"—A review [of Osborn]. *Amer. Mus. Journ.*, vol. 16, pp. 13-21. February, 1916.

Piltdown type, p. 15. "Had this discovery [that the jaw represents a chimpanzee] been available at the time of writing our author could have made his case stronger [that the Piltdown fossils are late (not early) Pleistocene]."

WOODWARD, ARTHUR SMITH. On the lower jaw of an anthropoid ape (*Dryopithecus*) from the upper Miocene of Lérida (Spain). *Quart. Journ. Geol. Soc. London*, vol. 70, pp. 316-320, pl. 44, text figs. 1-2. December, 1914.

Figure 1 (cross sections of symphysis) shows the resemblance of the Piltdown jaw to that of recent *Pan* and its striking difference from that of *Gorilla* and *Homo heidelbergensis*.

———. Discussion [of a paper by Lyne]. *Proc. Roy. Soc. Medicine*, London, vol. 9, Odont., p. 52. February, 1916.

"It seems to me most improbable—almost incredible—that when we find a unique Primate skull in the same place as an absolutely new Primate jaw, and close to an entirely new Primate tooth, we are dealing with the remains of three distinct animals."

WRIGHT, WILLIAM. The Antiquity of Man [Review of Keith]. *Man*, vol. 16, pp. 124-127. August, 1916.

Piltdown man, p. 126. "It has been pointed out that it would be strange if they [the skull and jaw] were parts of two different and previously unknown animals, but now that we learn from Professor Keith's reconstruction of *Eoanthropus* that the cranium falls within the range of human variation, we have only to suppose that, with parts of man was found part of an unknown anthropoid ape—after all, surely not a very high flight of imagination. Certain parts of a tooth of *Stegodon* were found for the first time in

Western Europe in the same deposit. Mandibles have a habit of appearing apart from the rest of the animals to which they belonged . . . and, further, it was quite time that representatives of our modern anthropoid apes were appearing." See Smith, May, 1916.

WRIGHT, WILLIAM. The endocranial cast of the Piltdown skull. *Man*, vol. 16, p. 158. October, 1916.

Reply to Smith, September, 1916.

PLATES

EXPLANATION OF PLATES

PLATE 1

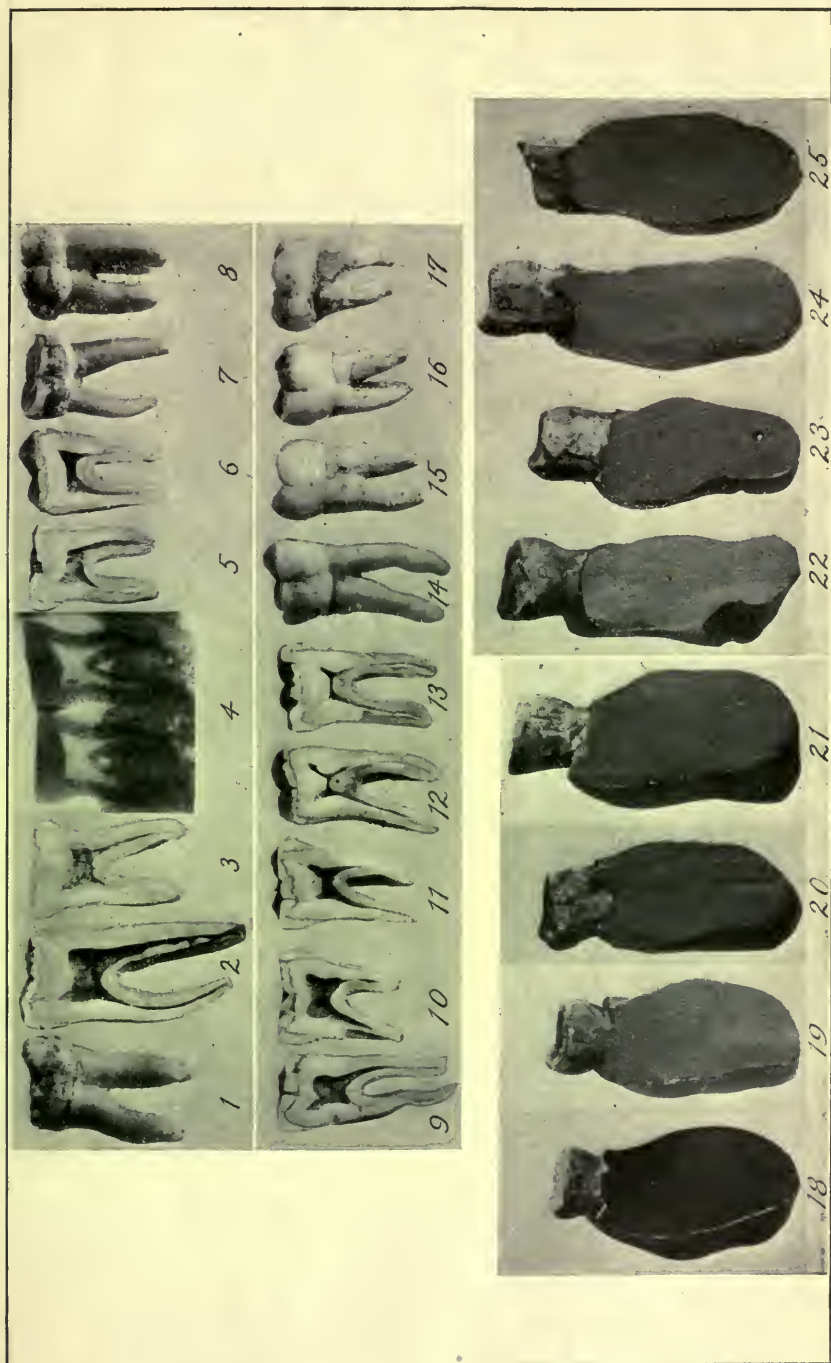
(All figures about natural size)

Figures 1-17 lower molars.

- Fig. 1. *Pongo*. No. 145300, U. S. National Museum. (m_2).
2. *Pongo*. No. 142195, U. S. National Museum. (m_2).
3. *Pongo*. No. 145320, U. S. National Museum. (m_1).
4. *Pan vetus* England. Radiograph copied from Underwood, British Journ. Dent. Sci., vol. 56, second plate between pp. 650 and 651. (m_1 and m_2).
5. *Pan* sp. Africa. No. 176243, U. S. National Museum. (m_2).
6. *Pan* sp. Africa. No. 176235, U. S. National Museum. (m_2).
7. *Pan* sp. Africa. No. 84655, U. S. National Museum. (m_1).
8. *Pan* sp. Africa. No. 176227, U. S. National Museum. (m_2).
9-17. *Homo*. Figs. 9, 12, 13, 14 modern European; figs 10, 15 Egyptian; figs. 11, 17 American Indian. Unnumbered specimens in U. S. National Museum. Fig. 17 m_3 , the others m_1 or m_2 .

Figures 18-25 sections of right mandible including m_1 . The inner side is at the left. Casts made at U. S. National Museum.

- Fig. 18. *Pan* sp. Africa. No. 84655, U. S. National Museum.
19. *Pan* sp. Africa. No. 174700, U. S. National Museum.
20. *Pan* sp. Africa. No. 176235, U. S. National Museum.
21. *Pan vetus*. England. Copy (made at U. S. National Museum) of cast received from British Museum.
22. *Homo*. Krapina.
23. *Homo*. Modern European.
24. *Homo*. Mongolian. No. 278783, U. S. National Museum.
25. *Homo*. Kaffir. No. 263198, U. S. National Museum.



1-3, Pongo. 4, 21, Pan vetus. 5-8, 18-20, Pan (Africa). 9-17, 22-25, Homo
Upper: The Pittdown Molars, compared with those of Orang, Chimpanzee and Modern Man. *Lower:* Vertical sections of lower jaws of Pittdown, Chimpanzee and Man, at first molar.

PLATE 2

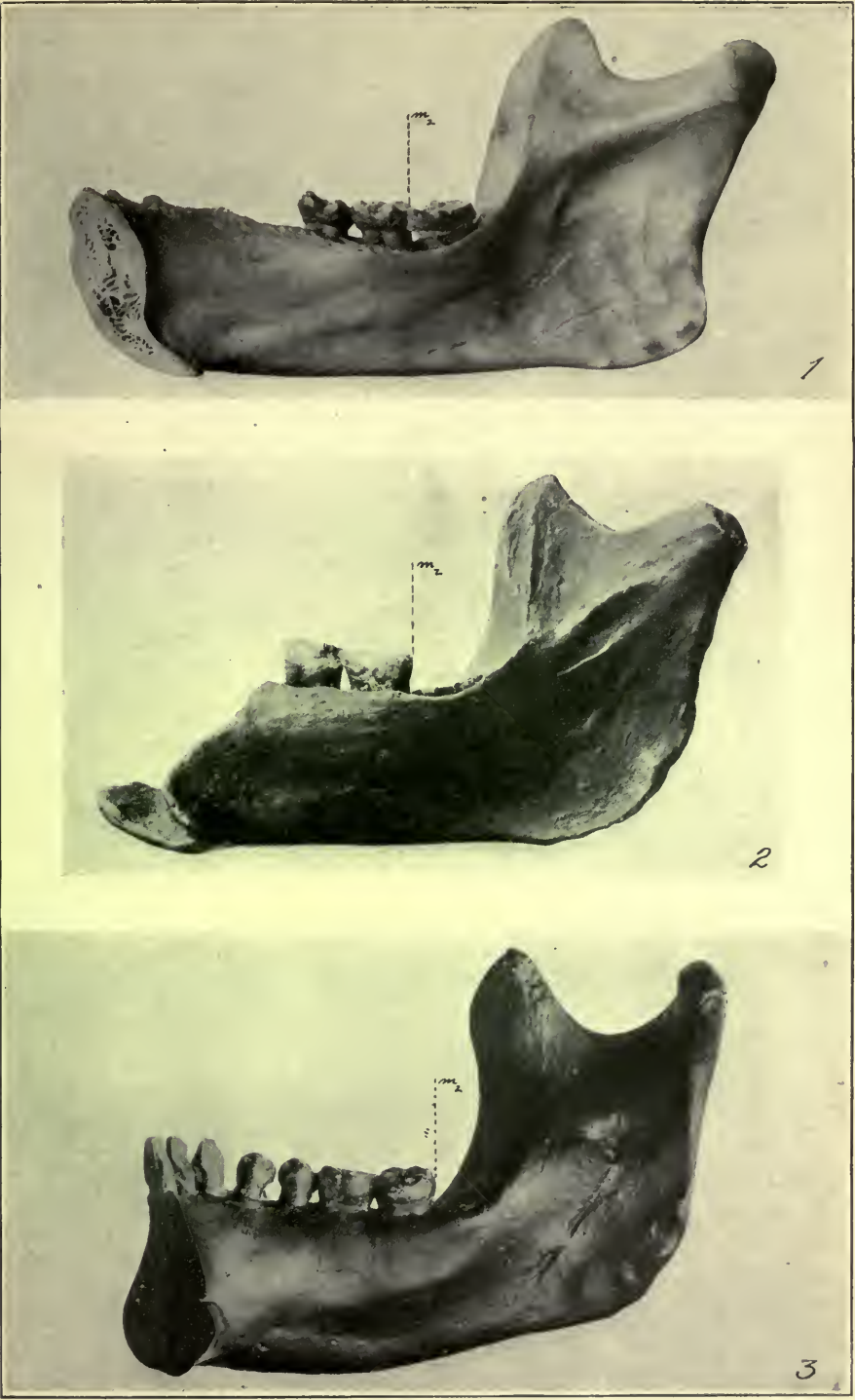
(All figures about three-quarters natural size)

(The perpendicular lines indicate posterior border of second molar)

Upper figure. *Pan* sp. Africa. No. 174700, U. S. National Museum.

Middle figure. *Pan vetus*. England. Cast received from British Museum.

Lower figure. *Homo*. Kaffir. No. 263199, U. S. National Museum. Cast made at U. S. National Museum.



Left mandible viewed from lingual side: 1, Pan (Africa); 2, Pan vetus; 3, Homo (Kaffir)

PLATE 3

(Mandibles about three-quarters natural size; teeth not to scale)

Figures 1 to 4. Right mandible with ascending ramus cut off about 3 mm. below lowest region of sigmoid notch. The camera has produced a slight distortion by increasing the length of cut area and reducing the size of those portions of the jaw which lie below the level of the teeth. The upper ink line indicates the axis of the ascending ramus, the lower line indicates the direction of the tooththrow.

Fig. 1. *Gorilla* sp. Africa. Female, No. 174711, U. S. National Museum.

2. *Pan* sp. Africa. Female, No. 174700, U. S. National Museum.

3. *Pongo*. Borneo. Female, No. 153828, U. S. National Museum.

4. *Pan vetus*. England. Copy (made at U. S. National Museum) of the cast received from British Museum.

Note discrepancies between this figure and the drawing published in Reply, fig. 4 (p. 408).

Figures 2', 2'' and 4'. Lower molars reduced to approximately uniform length.

Fig. 2'. *Pan* sp. Africa. No. 84655, U. S. National Museum.

2''. *Pan* sp. Africa. No. 176226, U. S. National Museum.

4'. *Pan vetus*. England. From "A Guide to the Fossil Remains of Man in the British Museum," pl. 4, fig. D.



Left mandible: 1, Gorilla; 2, Pan (Africa); 3, Pongo; 4, Pan vetus
 Lowest figures: Lower molars of Chimpanzee (2', 2'') and Piltdown (4') jaws

PLATE 4

(Both figures greatly reduced)

- Fig. 1. Skull of *Pan* sp., Africa, No. 84655, U. S. National Museum, bearing casts of Piltdown jaw and left canine.
2. The same skull bearing its own jaw (mutilated cast) and canine.

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2, Skull of Pan (Africa) with its own jaw and canine



1, Skull of Pan (Africa) with Piltdown jaw and canine

ON CERTAIN ESKIMOID CHARACTERS IN ICELANDIC SKULLS

E. A. HOOTON

The Peabody Museum of Harvard University possesses a collection of skeletal remains from Iceland consisting of 1 complete skeleton, 2 incomplete skeletons, 3 skulls with mandibles, 80 skulls without mandibles, including 60 in fairly good condition, 62 odd mandibles, and a large number of long bones and other skeletal parts.

These remains were collected in 1905 by John W. Hastings and Vilhjalmur Stefánsson. The Hastings collection (P. M. Cat. Nos. 57853-57885) came from Alftanes, Iceland, a small island off the coast near Reykjavik. The data in connection with the material are as follows:

These bones came from a church graveyard still in use. The church dates back to 1000 or so A.D. The bones were taken from what was said to be the oldest portion of the graveyard. They were taken out of a hole 6 x 12 and some 7 feet deep, out of which came the fragments of some 50 individuals. Owing to the Icelandic custom of burying the dead 6 feet deep and of using such small graveyards that in the course of years many interments have to be made in the same place, the oldest bones were found at a depth of from 2-5 feet. Six feet down were one or two burials that must have been made within the last 50 years. The tradition of the place was that part of the graveyard was so full on account of the Black Death which occurred in Iceland in 1402.

The remains collected by Stefánsson (P. M. Cat. Nos. 57886-57957) come from "Haffiorderey, Iceland (Hafrsfjarthar-ey, or Haffjartharey)."

These bones are from a church graveyard of considerable age. The oldest records of the church date from 1200 A.D. The church was removed in 1563. As far as is known there have been no subsequent burials.

Mr. Hastings began a study of this collection and also of a series of measurements and observations made by him upon living Icelanders, but the work was interrupted by his death. His incomplete notes were deposited in the Peabody Museum. I hope at a future date to publish a complete report on this collection, together with an elaboration of the anthropometric data secured by Mr. Hastings.

The present paper concerns itself with certain striking resemblances to Eskimo characters exhibited in this Icelandic collection, especially

by the skulls.¹ I have ventured to call these "Eskimoid characters," because they occur in association predominantly in Eskimo skeletons, although they are by no means wholly confined thereto, and are probably not racial characters but rather environmental adaptations which we may expect to find in some degree among all peoples living in Arctic or sub-Arctic regions and subsisting more or less exclusively on a diet of fish and flesh.

These characters are the mandibular torus, the palatine torus, the thickened tympanic plate, and the scaphoid skull vault. All of these seem to be mechanical adaptations due to excessive development of the masticatory apparatus. These characters will be discussed successively. Certain other resemblances between the long bones of Icelanders and Eskimo, especially in the femora, are possibly due to influences other than diet and have a more general distribution among primitive races. These will not be considered in this paper.

THE MANDIBULAR TORUS

The *Torus mandibularis* is a hyperostosis of the mandible so called by Fürst.² It had been previously observed by J. Danielli³ in the mandibles of Ostiaks, Norwegians, and Lapps, and by Sören Hansen⁴ as a feature of Eskimo lower jaws. It consists of a bony ridge or series of elevations on the lingual side of the alveolar process above the mylo-hyoid line, variable in its development and extension between the canines and the second or third molars. It is generally most prominent on the lingual side of the premolars and consists of compact bony tissue. According to Dr. Hrdlička⁵ this physiological hyperostosis

¹ The author wishes to express his obligation to Prof. R. B. Dixon of Harvard University, and to Prof. Lawrence Baker of the Harvard Dental School, for valuable suggestions. He also wishes to thank Mr. S. J. Guernsey of the Peabody Museum for his assistance in preparing the illustrations which accompany this article.

² Carl M. Fürst, *Der Torus mandibularis bei den Eskimos und andern Rassen*, Verhandlungen der Anatomische Gesellschaft v. Berlin, 22, 1908, p. 295 sq.

³ J. Danielli, *Archivio per l'Antrop. e l'Anat.* 1884, vol. 14, p. 333, 599.

⁴ Sören Hansen, *Bitrag til Eskimoernes Kraniologi*, Medd. om Grönland, xvii, 1895, p. 356.

⁵ Aleš Hrdlička, *Contribution to the Anthropology of Central and Smith Sound Eskimo*, *Anthropological Papers of the American Museum of Natural History*, Vol. V, Part II, 1910, p. 211.

Cf. also Ernest William Hawkes, *Skeletal Measurements and Observations of the Point Barrow Eskimo, etc.*, *American Anthropologist*, vol. 18, No. 2, 1916, p. 233.

"is undoubtedly of functional origin, the result of extraordinary pressure along the line of teeth most concerned in chewing, yet its occurrence in infant skulls indicates that at least to some extent the feature is already hereditary in these Eskimo [Southampton Island]."

Prof. Lawrence Baker has called my attention to the fact that even in modern civilized races all mastication tends to be directed toward the median line, and that the power cusps of the opposing molars, upon which the greatest amount of wear is to be observed, are the postero-external cusps of the lower molars and the antero-internal cusps of the upper molars. In primitive races, in which the lateral grinding movements are particularly marked, the effect is often seen on the crown of the lower molars which slope outward, and those of the upper molars which slope inward.⁶

The same pressure toward the median line necessitates the lingual reinforcement of the mandibular torus in cases where the natural strength of the alveolar processes and of the mandibular arch is not sufficient to withstand the strain directed medially in mastication. In many primitive races with massive masticatory apparatus which is subjected to hard usage, the mandibular torus is entirely lacking or very rare. This, I take it, is because the natural strength of the mandible is adequate without reinforcement.

The Eskimo, as has frequently been observed, makes an altogether abnormal demand upon his masticatory apparatus, not only by his diet, but also, in the case of the women, by chewing leather, and, in the case of the men, by using the teeth in tying knots, etc. Therefore, although the Eskimo jaw is naturally strong and massive, the additional reinforcement of the mandibular torus is required. This torus is doubly necessary in the case of the Icelandic, who, belonging to the Nordic race, has the reduced jaws characteristic of civilized European peoples, and yet makes the demands on his masticatory apparatus that a fish and flesh diet in a sub-Arctic climate entails.

The usual concentration of this bony reinforcement between the canines and the first molars requires explanation. It would be natural to expect this concentration opposite the molars rather than the premolars, since the former are more particularly the grinding and crushing teeth. In grinding movements the fulcrum of the mandible tends to be at the condyles; the power is applied, for the most part, to the ascending rami; the weight is anterior to the power. Consequently

⁶ Cf. F. H. Knowles, *The Glenoid Fossa in the Skull of the Eskimo*, Canadian Geological Survey, *Mus. Bull. No. 9, Anthr. Series, No. 4*, p. 10.

the strain is carried forward toward the symphysis, especially in the lateral grinding movements. Moreover, primitive people wear down their anterior teeth in comparison with the molars relatively more than do civilized races, both because they do not habitually substitute knife and fork for incisors and canines in cutting their food into pieces suitable for mastication, but bite or tear off mouthfuls, and also because they stuff their mouths with large quantities of food, a considerable portion of which must be chewed with the anterior teeth.

In the Icelanders the mandibular torus is often situated so far forward that it strengthens the symphyseal region, as may be observed in Plate 5, figure 2. A most unusual hyperostosis is to be seen on the mandible of one male Icelander (P. M. Cat. No. 57885) (Pl. 5, fig. 3). This affects the inferior border of the symphysis on its internal aspect and makes the genial tubercles assume the appearance of a tuberosity. No doubt the same mechanical causes have operated here, but the vertebræ associated with this skeleton show marked marginal exostoses due to arthritis, and this hyperostosis of the genial tubercles may be partly pathological in origin.

The Icelandic collection contains 56 adult mandibles, of which only 5 are associated with skulls. In observing the mandibular torus I have not attempted to distinguish the sex in these odd mandibles. As the character does not lend itself to measurement, I have made the following classes: Absent, slight, medium, pronounced, very pronounced. The "slight" class includes mandibles which exhibit small and isolated but easily perceptible additions of compact tissue along the lingual borders of the alveolar processes; the "medium" class includes those in which the hyperostoses are larger and more extensive; in the "pronounced" and "very pronounced" classes they assume the character of large tuberosities and continuous or intermittent ridges. Repetition of these morphological observations on the same series shows an occasional variation in the degree of development of the characters ascribed to an individual, but these variations are infrequent, occurring almost exclusively in the last two classes, and by no means invalidate the results.

The torus was not observed in the mandibles of infants or in those of very young children. Plate 5 illustrates mandibles of the "very pronounced" class only.

Table I indicates the distribution of the character with comparative data from other races.

TABLE I. MANDIBULAR TORUS

RACE		ABSENT	SLIGHT	MEDIUM	PRO- NOUNCED	VERY PRO- NOUNCED	TOTAL
Icelanders.....	Cases.....	18	16	9	8	5	56
	Per cent....	32.1	28.6	16.1	14.3	8.9	67.9
Eskimo.....	Cases.....	4	8	7	7	5	31
	Per cent....	12.9	25.8	22.6	22.6	16.1	87.1
Southern California In- dians.....	Cases.....	44	2	0	0	0	46
	Per cent....	95.7	4.3	0.0	0.0	0.0	4.3
Italians.....	Cases.....	29	1	0	0	0	30
	Per cent....	96.7	3.3	0.0	0.0	0.0	3.3
Chukchi.....	Cases.....	1	1	0	0	0	1
	Per cent....	100.0	100.0	0.0	0.0	0.0	100.0

It will be observed in the above table that of 31 Eskimo mandibles 27, or 87.1 per cent, exhibited the *Torus mandibularis* in some degree. This result agrees with that of Fürst⁷ who in a large collection of Eskimo crania found about 80 per cent with the mandibular torus. A comparison of the Icelandic material with the Eskimo material examined by the author shows the appearance of the character in 67.8 per cent of the former as against 87.1 per cent of the latter. As would be expected, the more pronounced development of the character is relatively more frequent in Eskimo than in Icelanders. In the Icelandic mandibles the torus is more often composed of isolated ridges and knobs than in the Eskimo, with whom it is usually continuous. Danielli⁸ found 5 of 17, or 29.4 per cent, of Lapp mandibles exhibiting the mandibular torus, 11 of 32 Ostiak mandibles, or 31.4 per cent. Fürst found it in 17 per cent of Swedish mandibles.⁹

For comparison with the Icelandic and Eskimo material in regard to the functional adaptations with which this paper is concerned there were selected series of crania from prehistoric graves in the Santa Catalina Islands, off the coast of southern California, medieval and modern Italian crania, and crania of Libyans from the Siwah Oasis.

The Santa Catalina crania are dolichocephalic and mesocephalic skulls, decidedly scaphoid, and with large jaws. They are especially suitable for comparison with Eskimo because they probably represent

⁷ Loc. cit.⁸ Loc. cit.⁹ Loc. cit.

the earlier dolichocephalic branch of the American race. In spite of the large development of their masticatory apparatus only 2 of 44 mandibles examined, or 4.3 per cent, showed any trace of the mandibular torus.

The Italian crania were selected because the inhabitants of Iceland are of Nordic stock and it was desired to compare with them skulls of Europeans of approximately the same period living in more temperate climates. The Italian skulls are of mixed Mediterranean and Alpine stock and come, for the most part, from medieval churchyards. A comparison with Nordic crania would have been preferable, but an adequate series was not available. One of 30 Italian mandibles, or 3.3 per cent, showed a very slight trace of the bony reinforcement under consideration.

The Libyan crania are those of a dolichocephalic people of the Mediterranean race and may reasonably be compared with the dolichocephalic Icelanders of Nordic stock, in view of the unquestionable resemblance that exists between the crania of these two races. The Libyans represent long heads in a subtropical environment; the Icelanders long heads in a sub-Arctic environment. Only 12 of the Libyan crania examined had mandibles associated with them and none of these showed any signs of the mandibular torus.

It seems apparent from these comparisons that the mandibular torus is essentially a functional adaptation rather than a racial character and that it occurs especially among peoples living in northern latitudes and existing principally on animal food. We may call it an Eskimoid character because it is predominantly present in the crania of the only Arctic people whose anthropology is reasonably well known. But it also occurs in a large proportion of the mandibles of Lapps, Ostiaks, and Icelanders, to a lesser extent in Swedish mandibles, and probably elsewhere among northern peoples.

THE PALATINE TORUS

In contrast with the mandibular torus the palatine torus is a variation that appears with comparative frequency in most races. It consists in general of a thickening of the bony roof of the palate along the median line, variable in form and extent. It seems to be primarily a hyperostosis of the bone bordering the median suture and is usually a postnatal development.¹⁰ Some writers consider it due to the dispo-

¹⁰ Rudolf Martin, *Lehrbuch der Anthropologie*, Jena, 1914, p. 831.

sition of the glands along the alveolar margins of the palatal roof, asserting that in palates characterized by the longitudinal torus the glands are confined to the lateral parts of the palatal vault, while in those without the torus they extend to the median suture or are entirely absent.¹¹

In the view of the author the frequent presence of the palatine torus in the crania of Eskimos, Icelanders, Lapps, and other people of northern habitat who live principally upon a fish and flesh diet is due to precisely the same physiological factors which were held to account for the presence of the mandibular torus among the same groups. These people make unusual demands upon their masticatory apparatus and chew toward the median line. In the case of the upper jaw the strain medially directed is carried up to the summit of the palatine vault and the thickening of the palatal roof along the median suture forms a buttress to resist this pressure. In this case the hyperostosis does not occur on the alveolar processes because of the vaulted structure of the palate.

It will be argued that this hyperostosis occurs frequently on the palatal roofs of individuals belonging to civilized races in whom the masticatory apparatus is much reduced. It is possible that the hypothesis of structural reinforcement may not be applicable to all such cases. But in the majority of the European skulls exhibiting the torus that I have examined there is evidence of hard usage of the teeth and good development of the masticatory muscles. I was informed by a friend who has such a marked palatine torus as to cause a slight impediment in his speech, that from his childhood he has been fond of masticating tough meat.

The palate is notoriously susceptible to physiological conditions during the period of childhood and adolescence. Abundant evidence of this is found in the great frequency of malformed palates among the children of our city populations. Where the palatine torus occurs in constricted, high-roofed palates the hyperostosis along the edges of the median suture may be due to a general disturbance of growth resulting in a thickening along the median line instead of the normal broadening of the lamellæ forming the roof of the hard palate and the nasal floor. Pathological conditions often create an effect upon the conformation of bony parts which is superficially identical with the normal response of

¹¹ Alberto Cocchi, *Ricerche antropologiche sul Torus palatinus*, *Archivio per l'Antropologia e la Etnologia*, 22, 1892, p. 289, sq.

Cf. also L. Stieda, *Der Gaumenwulst*, *Internationale Beiträge zur Wissenschaftlichen Medicin*, Bd. I, 1891, p. 145 sqq.

the organism to functional requirements. The scaphoid skull vault and extensive temporal planes of the Eskimo are due to physiological adaptation, whereas the same features in the skull of a microcephalic idiot are the result of pathological causes. In the opinion of the author the palatine torus may be due either to acquired modification or to arrest of growth.

Among the Icelanders the palatine torus was found to be well developed in crania of young children (3 cases), and Duckworth¹² records its existence in the crania of Eskimo children. As a structural reinforcement it would naturally begin to manifest itself at this time, the

TABLE II. PALATINE TORUS

RACE		ABSENT	SLIGHT	MEDIUM	PRO- NOUNCED	VERY PRO- NOUNCED	TOTAL
Icelanders.....	Cases.....	17	16	11	11	4	59
	Per cent....	28.8	27.1	18.6	18.6	6.8	71.2
Eskimo.....	Cases.....	14	26	10	6	4	60
	Per cent....	23.3	43.3	16.7	10.0	6.7	76.7
Southern California In- dians.....	Cases.....	24	29	4	3	0	60
	Per cent....	40.0	48.3	6.7	5.0	0	60.0
Italians.....	Cases.....	27	9	4	0	0	40
	Per cent....	67.5	22.5	10.0	0	0	32.5
Swans.....	Cases.....	47	7	1	0	0	55
	Per cent....	85.5	12.7	1.8	0	0	14.5

pressure toward the median line tending to stimulate the growth of the bone and to cause the thickening of the edges along the suture.

Stieda¹³ distinguishes a broad, flat torus and a narrow, highly arched, spindle-shaped torus, between which are transitional forms. The broad, flat variety appears almost exclusively in the Eskimo and both types occur among the Icelanders, although the narrow type is infrequent.

As the form of the palatine torus does not permit the taking of satisfactory measurements I have classified it according to the degree of its development, taking into consideration elevation and extension longitudinally and transversely.

In addition to the above, the character was observed in 3 Chukchi

¹² W. L. H. Duckworth and B. H. Pain, A Contribution to Eskimo Craniology, *Journ. Anthr. Inst.*, 1900, XXX, p. 135.

¹³ Op. cit.

skulls, two of which had very marked palatine tori and the third a slight development; one Lapp skull, which also exhibited the torus in a very marked degree, and one Siberian skull which showed a small torus. Cocchi¹⁴ found the torus in all of 16 Fuegian skulls, or 100 per cent; in 21 of 30 Ostiak skulls, or 70 per cent; in 10 of 15 Samoyed skulls, or 66.6 per cent; in 18 of 25 Australian skulls, or 72 per cent; in 85 of 242 Papuan skulls, or 35.2 per cent; and in 52 per cent of 2,741 Italian skulls. Martin¹⁵ gives 60 per cent as the occurrence of the palatine torus among Eskimos and 88 per cent among the Lapps, but does not state the number of crania examined. The range of the character among Europeans, exclusive of Italians, is from 13.8 per cent (Bavarians) to 46 per cent (Poles). In a collection of 304 Guanche skulls I found the torus in 8.5 per cent but I did not note the varying degrees of development in the individual cases.

It will be apparent from the above figures that the palatine torus occurs most frequently in peoples of extreme northern or southern habitat with the exception, possibly, of the big-jawed Australians and Tasmanians, and the Polynesians (among the last named of whom Cocchi gives the occurrence as 73.3 per cent of 30 cases). It seems to me quite probable that a larger number of observations would reduce the percentages of occurrence in these groups, as neither of the two Australian skulls in the Peabody Museum exhibit the character, and an adequate number of Papuan skulls (242) examined by Cocchi shows only 35.2 per cent.

Table II shows that the very marked development of the character is found particularly among the Icelanders and Eskimo.

It is instructive to note that Cocchi found the palatine torus particularly remarkable for size in his Fuegian crania, all of which exhibited the character. The length varied from 40 to 50 mm. and the breadth from 10 to 15 mm. Here again the torus shows a notable development in the crania of a people who subsist principally upon fish and animal food and who live in an extreme southern climate. It should be remarked, however, that the one Fuegian skull in the Peabody Museum collection is devoid alike of mandibular torus, palatine torus, and thickened tympanum.

The table shows that whereas 60 per cent of the ancient southern California Indians have the palatine torus, the development is pro-

¹⁴ Op. cit., p. 286 sq.

¹⁵ Op. cit., p. 832.

nounced in 5 per cent only, as against 25.4 per cent in the Icelanders and 16.7 per cent in the Eskimo. In the Italians and Siwans only a slight or medium development of the torus occurs.

Of 30 Eskimo skulls with jaws, 17, or 56.6 per cent, exhibited both the mandibular torus and the palatine torus. Eight skulls showed the mandibular torus without the palatine torus and four skulls the palatine torus without the mandibular torus. There seems to be some correlation in the degrees of development of the two characters in the same skull, and when one is but slightly developed the other shows a correspondingly small development or is absent in the most of cases.

Of 5 Icelandic skulls with which mandibles were associated 4 exhibited neither the palatine torus nor the mandibular torus, and the fifth had both characters well developed. It may be worthy of mention that the skulls associated with mandibles in the Icelandic collection are probably from the most recent burials represented. The custom in Icelandic churchyards was to clear out the earlier skeletal remains and throw them together into a pit, and it is probable that only the recent undisturbed interments yielded whole skeletons or skulls with mandibles.

Investigators studying the mandibular torus and the palatine torus separately have found both characters remarkably frequent and well developed in the Lapps and Ostiaks. It is therefore probable that they occur in association in the same individuals of these peoples. One Italian skull of 29 with mandibles had a slight development of the mandibular torus which was associated with a small palatine torus.

As a result of this investigation of the palatine torus it may be stated that this feature seems to be a structural reinforcement due to physiological adaptation, appearing most frequently in peoples with strongly developed masticatory apparatus who subsist mainly on animal food. Its occurrence in modern civilized peoples of mixed diet is probably due to the same factors in the majority of cases, but may in some instances be caused by abnormal conditions of growth and development. The difference in the distribution of the glands lying between the mucous membrane and the hard palate observed by Stieda and Cocchi is probably an effect of the presence or absence of the palatine torus rather than a cause.

THE TYMPANIC PLATE AND THE POSTGLENOID PROCESS

The shallowness of the glenoid fossa in the Eskimo skull is well known to anthropologists and has been made the subject of study by Knowles,¹⁶

¹⁶ Op. cit.

who associates it with the lateral grinding movements carried to an extreme by that people in their mastication of unusually tough substances. While this feature is unquestionably very common, according to my observations it is not always present in the Eskimo. It does **not** seem to be specially prevalent in the crania of Icelanders.

On the other hand I have been impressed in observing Eskimo crania, with the almost invariable thickness of the tympanic plate which constitutes, in part, the posterior wall of the glenoid fossa. I am not aware that this feature in Eskimo skulls has been made the subject of comment, although it is hardly probable that anthropologists have overlooked it.

Boule¹⁷ remarks that in the chimpanzee the tympanic plate does not contribute to the formation of the glenoid fossa except in a very small measure, being separated from it by the postglenoid process. The same condition exists in the skulls of the gorilla, orang-utan, chimpanzee, and many of the lower Primates. The tympanic plate is roughly cylindrical or tubular and its inferior surface is regularly convex, especially toward the auditory meatus. In most of the crania of modern men the tympanic plate is relatively shorter and more compressed between the mastoid and zygomatic portions of the temporal bone. The inferior surface is not cylindrical, and properly speaking there is no inferior surface; it is reduced to a more or less sharp edge separating two very unequal slopes. The anterior plane, which is almost vertical forms the greater part of the free surface of the tympanic bone, and at the same time almost all of the posterior wall of glenoid fossa, for, according to Boule, the postglenoid process in recent man is practically absent. In his view the formation of the tympanic bone in Neanderthal man is intermediate between the type found in the anthropoid apes and that prevalent in recent man, and he also finds a tendency toward a well-developed postglenoid process in the Mousterian race. He considers that of all recent men the Eskimo approaches most closely to the Neanderthaloid type in these features.

In regard to the postglenoid process in modern man Boule¹⁸ says:

Chez l'Homme actuel, sauf de rares exceptions, l'apophyse post-glénoïde est rudimentaire ou nulle. On ne distingue bien qu'en regardant le crâne de profil; on voit alors une légère saillie terminée par un bord aminci qui s'accôle,

¹⁷ M. Boule, *L'Homme fossile de la Chapelle-aux-Saints*, *Annales de Paleontologie*, 1911, p. 56.

¹⁸ *Op. cit.*, p. 67.

en avant du méat auditif, contre l'os tympanique dont elle est séparée par la fissure de Glaser.

He also seems to consider that a well-developed postglenoid process should have its summit detached from the tympanic plate.

The so-called postglenoid process is dependent for its existence upon the position and form of the glenoid cavity. It is simply the root of the zygomatic process thrown into relief by the anterior excavation of the glenoid fossa. When the glenoid fossa is deep and situated well forward from the tympanic plate, the process is well marked; when the glenoid cavity is shallow or situated farther back and close to the tympanic plate the postglenoid process is absent or rudimentary. Whether or not the postglenoid process covers a large part of the tympanic plate depends not only upon these factors but also upon the situation of the auditory meatus and the tympanic bone relative to the zygomatic process. In the adult gorilla the auditory meatus is situated much higher than it is in modern man, so that the posterior part of the glenoid fossa is formed entirely by the zygomatic root or postglenoid process. In the skull of a young gorilla in which the permanent dentition had not erupted the position of the auditory meatus was found to be relatively lower and the postglenoid process was not more markedly developed than it is in many modern human crania. The summit of the process was not detached from the tympanic plate which projected below it, whereas in the adult gorilla the tympanic plate is completely masked by this tubercle. Similarly in the illustration of the temporal region of the La Chapelle-aux-Saints skull, given by Boule, the large area of the anterior portion of the tympanic plate covered by the postglenoid process seems to be dependent upon the high anthropoid position of the auditory meatus and the tympanic bone, rather than upon an excessive projection of the zygomatic root.

In modern man, contrary to Boule's assertion, the postglenoid process is often well developed but it does not cover a large area of the tympanic plate because of the relatively lower position of the auditory meatus. I have found a well-developed postglenoid process to occur with considerable frequency in the skulls of most modern races, and especially in certain peoples belonging to the North African branch of the Mediterranean race—the Guanches and the Libyans from the Siwah Oasis. On the other hand, it is very rare among the Eskimo, who have shallow glenoid fossæ, for the most part. It occurred to me that the unusual thickness of the tympanic plate in the Eskimo, mentioned

above, might be due in part to the absence of the postglenoid tubercle in association with the shallow glenoid fossa, and to the consequent strain exerted by the condyles on the tympanic plate in the process of mastication.

Textbooks in anatomy state that a lobe of the parotid gland intervenes between the mandibular condyle and the tympanic plate. This is no doubt true in the case of many modern men with deep glenoid fossæ placed well forward, but in many Eskimo and other peoples with massive mandibular condyles these parts abut directly against the tympanic wall when the jaw is closed. In the movements of elevation and retraction considerable strain must be exerted against the tympanic plate.

In order to make clear the relations of these parts and the approximation to the Eskimoid type which Icelandic crania exhibit, it is necessary to describe certain variations which occur in the form of the lateral part of the tympanic plate.

Angelotti¹⁹ describes four types of the tympanic plate in man: (1) In which the internal and external margins of the tympanic plate diverge below so that the inferior portion forms a rugous, almost triangular area below the meatus. (2) In which the external and internal margins are approximately parallel and delimit a rugous semicircular band which follows the contour of the auditory meatus. (3) In which the posterior portion of the tympanic plate is developed at the expense of the anterior, and the rugous portion belongs almost exclusively to the posterior part. (4) In which the rugous surface is absent.

He finds these varieties occurring in almost every race at every age among the 2,000 crania examined by him, but he does not state the distribution. For the purposes of the present investigation I have found it more convenient to distinguish the following types: (1) In which the floor of the auditory meatus is relatively horizontal; the upper and lower borders of the inferior part of the tympanic plate are well-defined, continuous, and approximately in the same vertical plane; the summit of the vaginal process is above or on a level with the inferior edge of the tympanic plate. (2) The floor of the auditory meatus slopes abruptly downward and outward; the upper edge of the posterior portion of the tympanic plate is ill-defined and situated mesialward from the lower edge; the summit of the vaginal process is above or on a level with the

¹⁹ Guido Angelotti, *Variazioni e lacune nella "pars tympanica" del temporali*, *Atti della Società Romana di Antropologia*, Vol. XV, 1909-1910, p. 36.

lower edge. (3) The floor of the meatus slopes abruptly downward and outward; the posterior portion of the tympanic plate is beveled outward and both borders are ill-defined; the summit of the vaginal process is below the inferior edge of the tympanic plate.

The anterior and posterior portions of the tympanic plate vary in thickness within each type, but are generally thicker and more massive in the first type, whereas in the third type they are usually thin. The first type corresponds roughly with Angelotti's first type and is predominantly found in Eskimo crania. The second type prevails among Icelanders and the crania of most races seem to exhibit principally the second and third types. In the Eskimo the anterior portion of the tympanic plate is notably thick and the posterior portion is generally

TABLE III. THICKNESS OF TYMPANIC PLATE

RACE	CASES	ANTERIOR PART			CASES	POSTERIOR PART		
		Min.	Max.	Mean		Min.	Max.	Mean
Eskimo.....	61	1.5	6.0	4.12	61	4.5	12.0	8.42
Icelanders.....	58	1.5	5.0	3.26	52	3.0	11.0	6.47
Southern California Indians.....	60	1.0	4.0	2.55	39	3.0	11.0	5.66
Italians.....	41	1.0	4.5	1.98	21	3.5	7.0	5.35
Siwans.....	56	0.5	4.5	1.98	28	3.5	9.0	5.53

extremely massive. To a lesser degree the same thickening is observed in the case of the Icelandic crania.

It seemed advantageous to measure the thickness of the anterior and posterior parts of the tympanic plate, and the following method was adopted: The thickness of the anterior portion was measured at a point on the lateral border on a level with the center of the auditory meatus; the thickness of the posterior portion was measured from the central point on the upper border to the lowest point on the inferior border. The first measurement can be taken on all modern human skulls, but the second measurement can be taken only where the lower portion of the tympanic plate is not beveled, but has distinct borders.

Table III indicates the means and ranges of the measurements in the various series of crania examined.

It is apparent from the above that the Eskimo have unusually thick tympanic bones and that the Icelanders approach them in this character, surpassing the big-jawed California Indians. Figure 1 shows graphically the distribution of thickness of the anterior portion of

the tympanic plate in four of these groups. It will be noticed that in all of the groups except the Eskimo the number of measurements of the thickness of the posterior portion of the tympanic plate is less than the

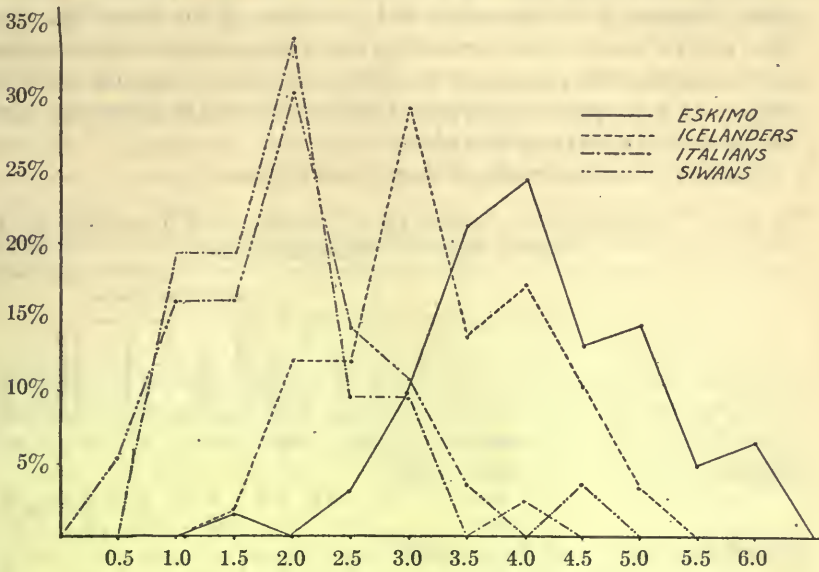


FIG. 1.—Anterior thickness of tympanic plate

number of measurements of the anterior portion. This is due to the larger numbers of the third type of tympanic plate in which the lower portion is thin and beveled, with indistinct edges, and may be incomplete.

TABLE IV. POSTGLENOID PROCESS

RACE		ABSENT	SLIGHT	MEDIUM	PRO- NOUNCED	VERY PRO- NOUNCED	TOTAL
Eskimo.....	Cases.....	34	16	5	6	0	61
	Per cent...	55.7	26.2	8.2	9.8	0	44.3
Icelanders.....	Cases.....	16	17	16	12	0	61
	Per cent...	26.2	27.9	26.2	19.7	0	73.8
Southern California In- dians.....	Cases.....	21	29	9	1	0	60
	Per cent...	35.0	48.3	15.0	1.7	0	65.0
Italians.....	Cases.....	14	14	11	2	0	41
	Per cent...	34.1	34.1	26.8	4.9	0	65.9
Siwans.....	Cases.....	12	15	16	10	2	55
	Per cent...	21.8	27.3	29.1	18.2	3.6	78.2

It seemed possible that there might be some relation between the thickness of the tympanic plate and the development of the postglenoid process. For the latter, when prominent, resists the posteriorly directed strain incident to the elevation and retraction of the mandible. Further, general observations seemed to point toward a prevailing absence of the postglenoid process in the Eskimo, whose tympanic walls are thick, and a frequent development of this feature in European skulls with generally thin tympanic plates.

Table IV gives the results of these observations.

TABLE V. CORRELATION OF POSTGLENOID PROCESS WITH THICKNESS OF ANTERIOR PART OF TYMPANIC PLATE

RACE		POSTGLENOID PROCESS					
		Absent	Slight	Medium	Pronounced	Very pronounced	Total
Eskimo.....	Cases.....	34	16	5	6	0	61
	Mean thickness.....	4.14	4.0	4.2	4.25	0	4.12
Icelanders.....	Cases.....	16	17	16	12	0	61
	Mean thickness.....	3.0	3.4	3.3	.9	0	3.26
Southern California Indians.....	Cases.....	21	29	9	1	0	60
	Mean thickness.....	2.55	2.5	2.6	4.0	0	2.51
Italians.....	Cases.....	15	13	11	2	0	41
	Mean thickness.....	1.78	2.14	2.04	2.0	0	1.98
Siwans.....	Cases.....	12	15	16	10	2	55
	Mean thickness.....	2.3	1.6	2.06	2.05	2.75	1.98

It is clear from the above table that a well-developed postglenoid process is relatively rare in the Eskimo, less so in the Italians and in the southern California Indians, but comparatively common in the Icelandic and Siwan crania.

The above result makes it very improbable that there is any close correlation individually between absence of a postglenoid process and thickened anterior walls of the tympanic plate, although taking the groups as units the Eskimo with thick tympanic plates infrequently have well developed postglenoid processes, and the Siwans with well-developed postglenoid processes usually have very thin tympanic plates.

Nevertheless, in glenoid fossæ with well-developed postglenoid processes the anterior wall of the tympanic plate is usually very thin behind the process where it is shielded from the thrust of the condyle, although it often becomes abruptly thicker below the process at the point where the measurement is taken.

In general the investigation of this feature seems to confirm the view that the thickening of the tympanic plate in the Eskimo is yet another instance of structural reinforcement through physiological adaptation, and that the same condition in a lesser degree obtains in the crania of Icelanders. There is no clear relation in individuals between the development of the postglenoid process and the thickness of the anterior tympanic wall.

THE SCAPHOID SKULL VAULT

The effect of the temporal muscles upon the form of the skull vault has been demonstrated in a classical article by Prof. Arthur Thomson.²⁰ Dr. Hrdlička²¹ ascribes the sagittal elevation, which is predominantly a feature of Eskimo crania, to the exceptional development of the temporal muscles:

Morphologically, it consists in part of a strengthening of the bone along the median line, and in part of a more acute arching of the skull along this line, and its length corresponds nearly to the extent of those parts of the temporal muscles which exercise the greatest action. It arises in the opinion of the writer on the one hand, and in the main, by the forced expansion of the cranial cavity upward, in the direction of the least resistance, . . . and is due to the interference with the lateral growth by the extraordinarily developed temporal muscles, and on the other hand by an accumulation of bone along the median line, due to the increased tension along this line, where the growth of bone is more rapid (at least so along the sagittal suture), due to the pressure of the temporal muscles while active.

It is apparent in the light of this explanation, which is unquestionably correct, that the sagittal elevation is due in part to causes identical with those invoked by the author of the present paper to explain the palatine torus and the mandibular torus, namely, pressure directed mesially in the process of mastication. The sagittal elevation also serves as a structural reinforcement.

²⁰ Arthur Thomson, A consideration of some of the more important factors in the production of man's cranial form, *Journ. Anthr. Inst.*, vol. 33, 1903. p. 135 sqq.

²¹ Op. cit., p. 195.

TABLE VI. SAGITTAL ELEVATION

RACE		ABSENT	SLIGHT	MEDIUM	PRO- NOUNCED	VERY PRO- NOUNCED	TOTAL
Eskimo.....	Cases.....	2	10	17	24	8	61
	Per cent...	3.3	16.4	27.9	39.3	13.1	96.7
Icelanders.....	Cases.....	12	24	10	14	1	61
	Per cent...	19.7	39.3	16.4	22.9	1.6	80.3
Southern California In- dians.....	Cases.....	7	7	8	31	7	60
	Per cent...	11.7	11.7	13.3	56.6	11.7	88.3
Italians.....	Cases.....	31	9	1	0	0	41
	Per cent...	75.6	22.0	2.4	0	0	24.4
Siwans.....	Cases.....	51	5	0	0	0	56
	Per cent...	91.1	8.9	0	0	0	8.9

The presence of the sagittal elevation in the Icelandic skulls, as may be observed from the preceding table, is remarkable. This character is usually lacking in modern crania of the Nordic type but is to be found in varying degrees in a large proportion of neolithic crania from northern Europe in which the masticatory apparatus is well developed. Except in a few instances the sagittal elevation in the Icelanders is not associated with a diminution in width of the cranial vault and a great increase in the height, as in the Eskimo. When compared with the California Indians the Icelandic crania exhibit a lesser frequency of the sagittal elevation and the higher grades of development are not as common. But these California crania show as pronounced a development of the character as the author has ever observed in any group except the Eskimo. They have very large jaws and well-developed temporal muscles, but, as in the case of the Icelanders, the sagittal elevation is not usually associated with an extremely narrow, high skull vault.

CORRELATION OF CHARACTERS IN INDIVIDUALS

Having observed that the Icelandic and Eskimo crania resemble each other as groups in the frequent manifestation of the mandibular torus, the palatine torus, the thick tympanic plate, and the scaphoid skull vault, it remains for us to determine to what extent these characters are found in association in individuals of the two groups and in the other comparative material.

Reference has already been made to the association of the mandib-

ular torus with the palatine torus in the Eskimo crania. Of 30 skulls with jaws, 17, or 56.6 per cent, exhibited both characters. In the other series the number of skulls with which mandibles were associated was so small that no conclusions could be drawn.

Of the 30 Eskimo skulls with jaws, 17, or 56.6 per cent, exhibited mandibular torus, palatine torus, thick tympanic plate, and sagittal elevation. For purposes of this correlation, the thickening of the tympanic bone was divided into the usual degrees of absent, slight, medium, pronounced, and very pronounced. There seemed to be some correlation between the degrees of development of the different characters in the same skull but it was not very pronounced.

Table VII shows the association of palatine torus, thickened tympanic plate, and sagittal elevation in the various groups for individuals.

TABLE VII. PALATINE TORUS, THICKENED TYMPANIC PLATE AND SAGITTAL ELEVATION

RACE	CASES	PER CENT	TOTAL NUMBER OF SKULLS
Eskimo.....	44	72.1	61
Icelanders.....	21	34.4	61
Southern California Indians.....	7	11.7	60
Italians.....	0	0.0	41
Swans.....	0	0.0	56

OTHER CRANIAL FEATURES

Eskimo crania generally show very prominent malars with somewhat protruding antero-inferior angles. Many of the Icelandic crania have also prominent malars but the protrusion of the antero-inferior angle is absent in spite of very strongly marked attachments of the masseter muscles. The prominent malars of the Eskimo are probably due only in part to physiological adaptation, as well-developed and large malars are a characteristic of the American race in general. The malars in the Icelandic crania are generally somewhat larger than those of most Nordic crania, but they do not approach the Eskimoid development.

Prevailing shallow suborbital (canine) fossæ are found in Eskimo, although this feature is variable. An individual survey of this character in the Icelandic series was not made, but general observations indicate that shallow suborbital fossæ are more common in these than in most European crania. A very deep suborbital fossa is associated

with a deflation of the maxillary sinus which weakens the structure of the face and is not commonly found in the crania of people with well-developed masticatory apparatus.

The extraordinarily narrow nasal aperture characteristic of the Eskimo, which is possibly due to climatic influence, does not occur in the Icelandic crania, in which the form of the nasal aperture, the nasal bridge, and the frontal processes of the superior maxilla are those normally observed in the skulls of northern Europeans.

The zygomæ of the Icelanders are more massive than those of most Europeans and the temporal crests are more strongly marked.

The mandibles are often massive but do not exhibit the very low, broad ascending rami and the everted angles often observed in those of the Eskimo.

CAUSES OF ESKIMOID CHARACTERS IN ICELANDIC SKULLS

It remains to be considered whether the Eskimoid characters observed in Icelandic crania are due to convergence by physiological adaptation through environmental causes or whether they may be assigned to the inheritance through race mixture.

Greenland was colonized by Icelanders under Eric the Red in 985. Stefánsson calculates that some 700 Icelanders went to Greenland the first summer.²² In the twelfth century there were two colonies in Iceland which were said by the medieval historian Björn Jónsson to consist of 190 dwellings and 90 dwellings, respectively. On the basis of this statement Stefánsson estimates the population to have been not far short of 3,000. In the fourteenth century the colonists were involved in trouble with the Eskimo and about the middle of the century the western settlement was completely destroyed and no one escaped to tell the tale. In the fifteenth century there are other records of destructive raids by "the heathen." The last mention of the colony is a Bull early in the pontificate of Alexander VI which confirms the appointment (ca. 1493) of the Benedictine monk Mathias to the colony of Greenland, and says that no ships have come away from there for 80 years, that the people have mostly fallen away from the true faith, and that this monk will endeavor to bring them back to the church. Stefánsson thinks that the colony was destroyed by the Eskimo rather than assimilated by them. The Eskimo tradition is that they destroyed their enemies by burning them to death in their houses.

²² Vilhjalmur Stefánsson, The Icelandic Colony in Greenland, *American Anthropologist*, n. s., vol. 8, No. 2, 1906, pp. 262-270.

Prof. R. B. Dixon has suggested to me that the Greenland colonists may have intermarried to some extent with the Eskimo, and individuals or families returning to Iceland from time to time might thus have introduced an Eskimo strain of blood into the Icelandic population. If this were the case we might regard the Eskimoid characters in Icelandic skulls as an instance of the hereditary transmission of an acquired modification. We are convinced that the characters discussed in this paper are acquired modifications in the case of the Eskimo, and, as has been mentioned, there is some evidence of the hereditary transmission of these characters in the Eskimo crania.²³

In this connection it is interesting to note that some travelers have considered that traces of Eskimo mixture exist in the Icelandic population. Says Burton:²⁴

The modern Icelander is a quasi-Norwegian, justly proud of his old home. His race is completely free from any taint of Skraelling, Innuít, or Mongoloid blood, as some travellers have represented, and as the vulgar of Europe seem to believe. Here and there but rarely, a flat dark face, oblique eyes, and long black horsehair, show that a wife has been taken from the land

Where the short-legged Esquimaux
Waddle in the ice and snow.

But in another passage the same author says:²⁵

The hair . . . seldom shows the darker shades of brown; and in the very rare cases where it is black, there is generally a suspicion of Eskimo or Mongoloid blood.

On the other hand, Nelson Annandale believes that the Icelanders exhibit traces of intermixture with the Lapps.²⁶ I have not been able to find any systematic treatise on the physical anthropology of the Icelanders and am not disposed to place complete confidence in the observations of Burton²⁷ who states that "the cranium is distinctly brachycephalic," inasmuch as all but three or four of our collection of some 85 skulls are either distinctly dolichocephalic or mesocephalic.

Burton also says in the same passage that "the face is round or square rather than oval; the forehead often rises high, and the malar bones stand out strongly, while the cheeks fall in."—"The jowl is strong and

²³ Vide supra, p. 3.

²⁴ Richard F. Burton, *Ultima Thule, or, A Summer in Iceland*, London, 1875, Vol. I, p. 130.

²⁵ Op. cit., p. 133.

²⁶ Nelson Annandale, *The Faroes and Iceland*, Oxford, 1905, p. 163 sq.

²⁷ Op. cit., p. 131.

square, and the chin is heavy, the weak 'vanishing' form being uncommon." Annandale also remarks that the face of the Icelandic type is "short, broad, square, and flat, often with prominent cheek-bones, with small, deepset eyes, a short, broad, nose, and a very large mouth; the complexion is pale, lacking the ruddy coloring of the typical Scandinavian skin."²⁸ Both writers also agree that the beard is scanty and does not appear until late.

Travelers in Iceland describe the natives as of a stout "square figure." Burton says, "They have the thick, unwieldy trunks of mountaineers, too long for the lower limbs The legs are uncommonly sturdy; the knees are thick, and rounded."²⁹ The femora of our Icelandic collection are extraordinarily like those of the Eskimo in their very marked curvature, massive heads and inferior condyles, and highly developed pilasters.

It is apparent from the above descriptions that the Icelanders exhibit many physical characters which are reminiscent of the Eskimo. The writer hopes to make a complete investigation of all of the skeletal remains of Icelanders in the Peabody Museum collection in comparison with an ample Eskimo series, which should determine whether these apparent resemblances are significant or merely superficial.

The history of the Icelandic colonies in Greenland, summarized above, would seem to indicate that the contact of the colonists with the Greenland Eskimo resulted in hostilities rather than intermarriage, but it is possible that the lost colonies were assimilated by the Eskimo. Since European communications with Greenland ceased about the beginning of the fifteenth century and no permanent European colony was established until 1721 it seems apparent that any strain of Eskimo blood in the Icelanders represented by our skeletal material would have to result from the return of the early colonists to Iceland, since most of the remains probably antedate the sixteenth century. On the whole there seems little probability that any of the Eskimoid characters exhibited in the skeletal remains of these medieval Icelanders represent the result of a race mixture.

On the other hand it seems possible to explain these Eskimoid characters in Icelandic crania which have been demonstrated above as physiological adaptations due to dietary and general environmental conditions approximating those to which the Eskimo have been subjected since their occupation of the Arctic regions of North America.

²⁸ Op. cit., loc. cit.

²⁹ Op. cit., Vol. I, p. 134.

Owing to the difficulty of raising cereals in the inhospitable climate of Iceland the people live principally upon a milk and fish diet. De Kerguelen, writing in 1767, says: "In summer food was of cods' heads, boiled like all other provisions: in winter the peasants ate sheeps' heads kept in fermented vinegar of sour milk (Sýra), or in juice of sorrel (Súra), and other plants, the mutton being sold. Bread was not the staff of life, being eaten only on high days and holidays, that is, at births, marriages, and deaths: the richer sort baked cakes, broad and thin, like sea biscuits, of black rye flour from Copenhagen."³⁰ "The children were weaned after the first week and were fed on the flesh of the foul mollie or fulmar-petrel."³¹ "For home consumption the cod is split and hung up unsalted in the 'wind-house.' It is known by its shriveled appearance, and, like the refuse heads, it is eaten uncooked."³² They also eat whale belly (Rengi) and the flesh of the dog shark. The latter is buried for two or three weeks, then washed, cut up into strips, which are hung for a year in the drying house before being considered fit for food. Burton declares that "the dried skate is the bread of this ichthyophagous race."³³ The flesh of sea fowl is also a staple article of diet and the Icelander particularly appreciates the flavor of the oil.³⁴ Horseflesh is also eaten in some parts of the island. Mutton is hung up to dry in the smoke of the peat reek and is eaten raw, "having acquired much the appearance and consistency of horn."³⁵

Cattle are raised and the milk, butter, and cheese are important articles of diet, but the flesh is too expensive to be eaten by the peasantry. The soil yields a few hardy vegetables, such as potatoes and turnips.

So far as I have been able to learn the Icelanders do not prepare leather by chewing the skins, but their dependence upon tough dried fish as the staple article of diet seems to account satisfactorily for the morphological characters in which they so closely resemble the Eskimo.

CONCLUSION

The results of this investigation may be summarized as follows:

(a) The crania of Icelanders show a striking similarity to those of

³⁰ M. de Kerguelen Tremarec, *Relation d'un Voyage dans la Mer du Nord*, 1772, quoted by Burton, *op. cit.*, Vol. I, p. 147.

³¹ Burton, *op. cit.*, Vol. I, p. 154.

³² *Ibid.*, Vol. I, p. 194.

³³ *Ibid.*, Vol. II, p. 239.

³⁴ Annandale, *op. cit.*, p. 127, *sq.*

³⁵ *Ibid.*, p. 192.

the Eskimo in the prevalence of the mandibular torus, the palatine torus, the thickened tympanic plate, and the sagittal elevation of the skull vault.

(b) Whereas there is a possibility of an Eskimo strain in the Icelandic population, it is altogether probable that these similarities are due in both peoples to an unusual development of the masticatory apparatus consequent upon an almost exclusively fish and flesh diet and the habitual chewing of very tough food.

(c) It may reasonably be expected that the same physiological adaptations will appear in the crania of any peoples living in far northern or southern lands, who are forced by their environment to subsist mainly upon animal food.



FIG. 1.—Eskimo mandible with mandibular torus



FIG. 2.—Icelandic mandible with mandibular torus



FIG. 3.—Icelandic mandible with hyperostosis of genial tubercles

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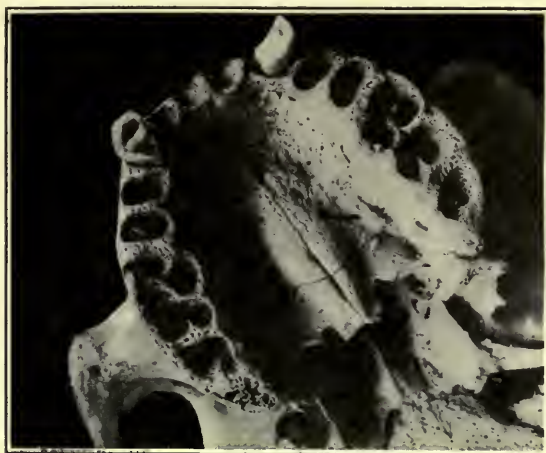


FIG. 1.—Eskimo with palatine torus

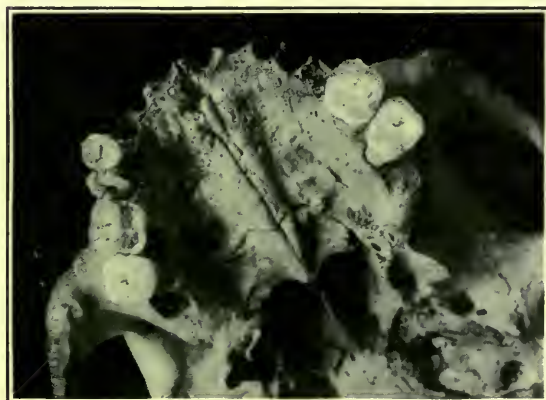


FIG. 2.—Icelander with palatine torus

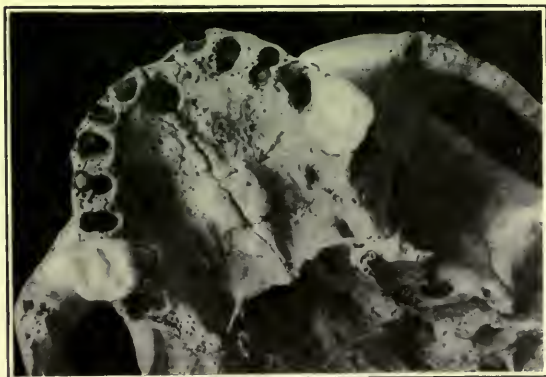


FIG. 3.—Icelander with palatine torus



FIG. 1.—Norma lateralis of Icelandic and Eskimo skulls



FIG. 2.—Norma frontalis of same

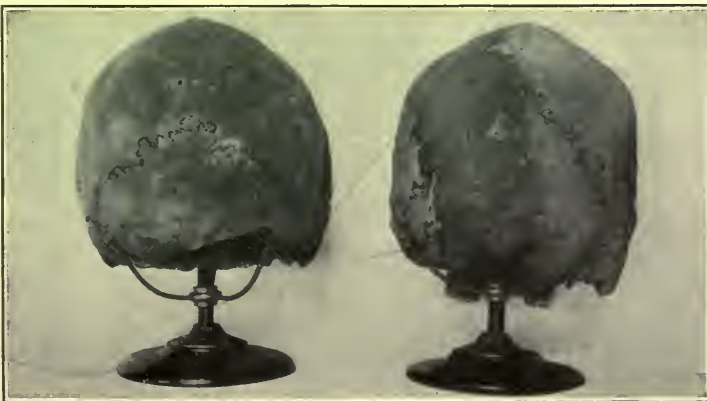


FIG. 3.—Norma occipitalis of same

ORGANIZATION OF THE COMMITTEE ON ANTHROPOLOGY
OF THE NATIONAL RESEARCH COUNCIL AND ITS
ACTIVITIES FOR THE YEAR 1917

By W. H. HOLMES

At a meeting of the Executive Committee of the National Research Council held in Washington, January 6, 1917, the writer was appointed Chairman of the Committee on Anthropology of the Council, and the appointment was later confirmed by the President of the United States. Dr. Aleš Hrdlička was named as Secretary and the activities of the Committee were initiated by a careful study of the several fields with which it might be called upon to deal, and of the possibilities of accomplishing results of value to the nation.

The further organization of the Committee presented certain difficulties which were gradually overcome. It was important that its activities should not encroach upon the field of any other branch of science, and it soon became apparent that it would have to deal exclusively with the problems of the physical man. Due to these and other exigencies, it was not until August, 1917, that the Committee was fully organized.

The membership then was as follows:

- William H. Holmes, Chairman, Head Curator, Department of Anthropology, U. S. National Museum.
- Dr. Aleš Hrdlička, Secretary, Curator, Division of Physical Anthropology, U. S. National Museum.
- Dr. Charles B. Davenport, Director, Station for Experimental Evolution, Cold Spring Harbor, N. J.
- Mr. Madison Grant, Trustee, American Museum of Natural History, New York City.
- Dr. Frederick L. Hoffman, Chief Statistician, The Prudential Insurance Company, Newark, N. J.
- Dr. E. A. Hooton, Instructor in Anthropology, Harvard University, Cambridge, Mass.
- Dr. George M. Kober, Dean of Medical Department, Georgetown University, Washington, D. C.
- Dr. Tom A. Williams, Psychiatrist and Anthropologist, Washington, D. C.

In the spring Dr. Williams left for service in France and later in

the year Dr. George Grant MacCurdy, of Yale University, was selected to fill the place.

Before the Committee as a whole could be called together, a series of recommendations were formulated, and submitted by the Chairman to the Research Council. They were as follows:

1. To regulate the measuring of recruits and the recording and utilization of the data obtained.

2. To revise the physical requirements in recruiting the new army as demanded by a consideration of the diversified characteristics of the many nationalities and races involved.

3. To utilize the opportunities offered by the recruiting of a great army for the prosecution of certain highly desirable researches in Physical Anthropology, especially those having a direct bearing on the future welfare of the race; and to gather statistics which should be available for comparative purposes in the near and far future.

A brief résumé of these recommendations was eventually published, under the title "Suggestions Relating to the New National Army by the Anthropological Committee of the National Research Council," in the *Proceedings of the National Academy of Sciences*, Vol. III, pp. 526-528, August, 1917. The object of the present communication is to discuss these recommendations more fully and to include also certain additional suggestions made during the latter part of 1917, after the above mentioned report was submitted.

As early as February 16, 1917, certain proposals were formulated by the Secretary of the Committee which under the heading "A National Anthropometric Survey," were submitted to Dr. Charles D. Walcott, Secretary of the Smithsonian Institution, for presentation to the Council. These recommendations, which were necessarily of a tentative nature, called attention to the great opportunities for comprehensive anthropological investigations that must necessarily be presented in case of war and urged that these opportunities be utilized to secure anthropometric measurements sufficient to establish normal physical standards throughout the country. It was suggested that the researches in question should extend to from four to six of the most important environmental areas of the United States, namely, New England, the Appalachian region, the southernmost and the northernmost Central States, the semiarid southwest, and the humid northwestern sections, and that the observations should be directed to differences in development, physical strength, and anthropological type of the male population in these different regions. The results

if accomplished would serve as standards for future anthropometric surveys of similar nature taken from generation to generation in the same regions, and form a basis for legislative and eugenic measures designed to correct or improve the physical status of the people wherever requisite. In addition it was recommended that when possible the investigations should be extended to the children of the several areas; and that similar physical standards be determined respecting the different classes of immigrants reaching this country, to be used in regulating the admission of foreign elements. The proposed researches would best be undertaken by a *National Anthropometric Survey Bureau* under the auspices of the Smithsonian Institution, and in coöperation with the War Department, the Public Health Service, the Bureau of Immigration, and other like governmental auspices, together with well established outside institutions or agencies.

When war between the United States and the central European powers became inevitable and the first draft of recruits was called, the Anthropology Committee felt justified in offering several new suggestions. These were presented on April 18, 1917, to Dr. V. C. Vaughan of the Medical Branch of the National Council of Defense and a short time afterwards were formally submitted to the National Research Council. In May they were submitted again in an amended form, and on June 2 an opportunity was given to the Secretary to present them orally before the Committee of the Medical Branch of the National Defense Council, where they were received with much favor. On June 6 these suggestions were made to the Research Council in a still more detailed form. They read as follows:

I. REGULATIONS OF METHODS AND INSTRUMENTS IN MEASURING RECRUITS

The recruiting of a large army from all parts of the national population will present certain conditions in which Physical Anthropology may be of practical service, and afford many opportunities by means of which this and related branches of science may greatly benefit. These opportunities were well appreciated by the leaders of the Army Medical Service during the Civil War, which resulted in the several volumes of valuable even though imperfect data by Gould and Baxter with their associates, and in the collections which now constitute the bulk of the precious material preserved in the Army Medical Museum.

The examination of recruits for admission into the new Army will include certain observations and measurements which if properly regulated, and taken by simple, accurate, standardized instruments,

would prove of much scientific value. The methods followed to-day, and also the instruments by which the measurements are taken, lack in uniformity as well as in accuracy. Unless a few necessary improvements are made in both, the data relating to a million or more men cannot be utilized by science with any confidence; and as properly revised regulations would not increase, but actually diminish the burdens of the examiners, the Committee takes the liberty of offering such a revision of the regulations and urging its adoption. An outline of the proposed modifications of the present examination blanks, and specifications for simple outfits of instruments, together with directions for the examiners, giving in plain language the instructions to be followed in taking measurements and physical observations, are herewith submitted.

In this as well as in other recommendations which the Committee has made, the utmost care has been taken not to add to, but rather to reduce the burdens of the medical examiners and the medical service of the Army. No additional tasks at this time unless of the highest practical importance could be justifiable or would be feasible.

The Committee advised that everything relating to measurements and other physical observations be segregated on one part of the regular enlistment blank; and that the blanks for the Army include observations on complexion, hair, and eye color, such as have always been carried by the blanks for the Navy. The following form is proposed, to constitute a part of the enlistment blank:

PHYSICAL MEASUREMENTS AND OBSERVATIONS

Height.....feet.....inches;
 Weight (stripped).....lbs.
 Girth of chest: { at maximum expiration.....
 { at maximum inspiration.....
 Complexion:* light
 medium
 dark
 Hair color:* blond, sandy, yellow
 brown: light
 medium
 dark
 black
 red: golden red
 sandy red
 brick red
 auburn or dark red-brown

Eye color: * blue: light
 medium
 deep
 brown: light
 medium
 deep
 greenish
 grey
 mixed or indeterminate

*Underscore the term covering most closely your observations.

The directions relating to measurements of the recruits contained in the regular Army and Navy blanks are to be superseded by the following:

Directions for Measurements at the Recruiting Stations.—The measurements of recruits, aside from their military use, may, if accurate enough, be also utilized for scientific purposes, and it is therefore important that the directions given below be followed to the letter.

Instruments (to be provided by the Department)

- A. Special linen or paper tape, 4 feet long, $1\frac{1}{4}$ inches wide, for measuring height, with feet marked 4, 5, 6, 7.
- B. Linen tape 4 feet long, $\frac{5}{8}$ inches wide, for measuring chest.
- C. A wooden square, an adjunct to A.

Procedure

1. Select the best lighted part of the available wall space in the room where the men are being examined. If a choice is possible, select the side on which the light strikes the subject from the left side.
2. Measure with tape A exactly three feet from the floor, and make a horizontal line at that point.
3. Fasten tape A with suitable tacks or nails vertically on the wall, in such a way that its lower edge coincides with the three foot mark. The top of the tape will now be 7 feet from the ground.
4. *Height:* Place subject, undressed, against the tape on the wall. See to it that he stands straight, but without straining or stretching, touching the wall with his heels, buttocks, and shoulders, and holding his head so that he looks straight forward. The head may touch the tape on the wall but does not need to do so.

Apply wooden square horizontally to tape on the wall and bring it down on the head of the subject, with sufficient pressure to feel the hard calvarium, and carefully note the measurement, to the nearest $\frac{1}{8}$ of an inch.

5. *Circumference of Chest:* The subject should face the light as well as the examiner, and raise his elbows to about 45 degrees from the body.

Facing the recruit the examiner passes the narrow tape (B) *horizontally* about the body, at the level of the nipples, and records measurements in deepest inspiration and utmost expiration.

Sources of error to be strictly avoided: Conversation during measuring; interruptions; incorrect reading of scale; incorrect recording. Measurements or recording must not be relegated to an untrained assistant.

*Estimates on Instruments**

	<i>cents</i>
Tape A.....	50-60
Tape B.....	30
Wooden square.....	20
* Actual estimates for large lots.	

II. MODIFICATION OF PHYSICAL REQUIREMENTS

As good health with physical fitness are the foremost requirements of the soldier and the sailor, the men drafted by the United States for its new Army and Navy must be subjected to careful examination in these respects. The object of such examination must be the selection, not of the tallest and strongest men, but of all those who on the basis of our physical and physiological knowledge may reasonably be expected to be fit or competent for the tasks before them, or who may be made so during the period of training.

It is self-evident that any reduction in the physical standards for recruits below certain minima would be highly undesirable, as it might be attended with costly consequences; but it is also true that to make these minima unnecessarily high would exclude from the ranks many men well fitted to serve.

Certain standards relating to the physical development and to the health of recruits have long been established in this country and are now employed in the recruiting offices. These standards differ somewhat in the different branches of the service. They are probably sufficient in normal times, but they take no account of racial differences in stature, weight, etc., and give little consideration to the question of improvement in the individual that is bound to follow the six or nine months of training, medical supervision and outdoor life.

Under these conditions it would seem advisable that the subject of physical and hygienic requirements for the recruit be now subjected to careful medical and anthropological scrutiny.

Dentition: Under present regulations the recruit is expected to have twenty sound teeth, including four opposite incisors and four opposite molars. As the prevalent defective condition of the teeth in many cases is connected with the food and other habits of modern civilization, or with accidental conditions, rather than with disease, and as

in a large majority of cases the condition of the teeth can readily be corrected by Army or Navy dentists, it would seem best that this stipulation be replaced by one permitting of more latitude in this direction. Possibly the following would meet the requirements: *The recruit is expected to have twenty sound teeth, including four opposite incisors and four opposite molars; but if his physical condition is otherwise satisfactory, he may be accepted even though below this dental standard, provided the defects of the teeth are such as can be readily corrected by Army or Navy dentists.*

Abnormalities: In the "Enlistment Instructions of the United States Navy, 1917," sec. 2, p. 35, in enumerating the various abnormalities which disqualify a recruit for acceptance the following are included:

- Parasites of the skin or its appendages;
- Deformity of the skull;¹
- Inequality of upper or lower extremities;
- Color-blindness;
- Polypi;
- Great enlargement of tonsils;
- A "predisposition" to heart or lung disease;
- Enlarged abdominal organs;
- Ingrowing nails;
- Bad corns;
- Large bunions;
- Deformity of toes.

As many of these conditions, unless in aggravated form, can be readily cured or corrected and would interfere but little, if any, with the military efficiency of the subject, while strict adherence to these rules would exclude many individuals otherwise fit, it would seem that the regulations above referred to should be modified. This could be accomplished most simply by omitting the cases above mentioned, for they are practically included in the first clause of the paragraph, which stipulates that among the causes of disqualification are "any disease or deformity, either congenital or acquired, that would impair efficiency."

Stature Requirements: The present minimum requirement of stature, in any branch of the Army or the Navy, is 5 feet 4 inches. In the case of mountain artillery it is 5 feet 8 inches.

The minimum for the English infantry and some other branches of

¹ Harmless scaphocephaly of the more moderate degrees is very common in the American negro.

the service prior to the present war was 5 feet 2 inches, and it has since been reduced. On the Continent the minimum differs with the nationalities, but is as a rule lower than that of the United States. In many of these nationalities the average height of the adult male does not reach, barely equals, or only slightly surpasses the minimum requirement for the soldier of the United States.² Many of these nationalities are well represented in this country. They include the Italians, Greeks, French, Mexicans, Spanish, Swiss, the Russian and Austrian Jews, many of the Slavs, the Magyars, Roumanians, Lithuanians, and even Germans. Should the present minimum in stature for the United States Army and Navy be rigidly adhered to, from one-fourth to one-half of the men belonging to or descending from the nationalities mentioned would be excluded by this rule alone, thus resulting in serious disadvantages, the chief among which would be that of placing a disproportionate burden in the formation of the Army on the naturally taller native American.

In view of the above facts, and as small stature in a large majority of cases signifies normal fluctuation and not any weakness or degeneration, as has been repeatedly proven by the "bantam" regiments of England and other short stature troops of European countries, the Committee recommends that the minimum stature requirement for the new United States Army be reduced, for all branches of the service, to 60 or at most 62 inches; and that corresponding with this, the minimum weight requirement be reduced from 128 to 120 pounds.

The maximum weight, the circumference of the chest (minimum acceptable, 32 inches) and the chest expansion (minimum, 2 inches) of the present requirements need no modification.

III. ADVANCED ANTHROPOMETRIC WORK AT THE CONCENTRATION CAMPS

It was evident to the Committee that the measurements on the drafted men taken by the examining physicians all over the country, even if properly regulated in accordance with the recommendations of the Committee, could not give us information on many important

² Approximate average height of the various nationalities:

	<i>Inches</i>		<i>Inches</i>
Italians.....	64.7	Russian Jews.....	64.1
Greeks.....	64.9	Austrian Jews.....	64.3
French.....	65.2	Roumanians.....	64.6
Swiss.....	64.4	Lithuanians.....	64.7
Austrian Slavs.....	64.8	Germans (in general).....	65.0
Magyars.....	63.7		

points concerning the physical development and type of the population. If the great opportunity presented by the formation of the new Army was not to be lost to Anthropology, it was necessary to formulate plans for additional measurements and observations at some if not all of the camps, by specially trained examiners. Such work would practically represent what the Committee had in mind when it made its original suggestions relating to the National Anthropometric Survey. The formal recommendations by the Committee on this subject were as follows:

The sixteen or more concentration camps will afford a unique opportunity for anthropometric observations, one object of which would be to obtain data regarding the normal physical conditions of the American people of different descent, admixture, education, social class, occupation, and environment.

To utilize these opportunities the minimum requirement would be the selection of six of the camps representing the northeast, southeast, the northern middle States, the south, the southwest, and the northwest; and placing in each a specially trained young medical officer who would devote his time to the anthropometric work.

The investigations, reduced to the minimum, would consist of the measurement of stature and height sitting; of the three principal dimensions of the head; of two diameters of the face; of two diameters of the chest; and of more precise observations on the color of the skin, eyes, and hair than are practicable at the recruiting stations.

The training and equipment of the six medical officers would be undertaken by the Department of Anthropology of the United States National Museum. The data procured would be elaborated without cost by the Statistical Staff of the Prudential Insurance Company of America. Publication of the results would be facilitated as far as possible by the Smithsonian Institution.

The total period of the investigations could be limited to six months if found advisable. The officers required for conducting the observations should be appointed by the medical departments of the Army and the Navy. Their special training at the United States National Museum would require approximately one month.

The above suggestions were favorably received, but it was soon found that it would be quite difficult if not impossible to secure from the Government the medical officers needed for making the examinations. In looking for a way out of this difficulty the Committee met with the suggestion that the needed help could possibly be secured

from the larger insurance companies of the country. It can be safely anticipated that Anthropology will before long play an important part in the examinations for life insurance, and the examinations in the camps would have given excellent training to young medical men in the employ of the various companies. It was therefore proposed to the insurance companies that each place at the disposal of the Committee, for a period of seven months, and at the expense of the company, one of its medical employees, who for the expenditure by the company would bring back the training and experience in anthropometry acquired under the auspices of the Committee. A number of promising answers were received to this proposition; but unfortunately considerable time elapsed before the subject could receive due consideration of the higher authorities, and meanwhile the medical staffs of the insurance companies were so depleted by the direct calls of the Army and Navy that eventually no men remained who could be spared for the anthropometric examinations.

Then there seemed to remain only one possibility before the Committee, which was to secure and train a half dozen young medical graduates of its own selection and have them do the work at the camps. Such men, however, would be, strictly speaking, employees of the Committee and as such would have to receive due compensation, which, with the expenses of the training period at Washington and that for the purchase of necessary instruments, was calculated collectively at \$7,000. This sum the Committee hoped to raise with the help of the Council. It was a modest sum considering the extent and importance of the work, and the prospects of results under such an arrangement were brighter than they would have been under either of the two previous propositions.

The blank proposed for this special examination, by the Secretary of the Committee, was as follows, the understanding being that the methods of securing the various measurements would follow strictly the International Anthropometric Agreements:

SPECIAL EXAMINATIONS

Name.....Age.....
 Occupation.....
 Born in (what State or country).....
 Birthplace (State or country):
 of father....., of mother.....
 of father's father....., of mother's father.....
 of father's mother....., of mother's mother.....

MEASUREMENTS

Body:	Face:
Weight.....	Length to nasion.....
Stature.....	Length to crinion.....
Height to shoulder (mean).....	Breadth, bizygom.....
Height sitting.....	
Head:	Miscellaneous:
Deformation of.....	Shoulders:
Length.....	Breadth.....
Breadth.....	Chest:
Height.....	Mean breadth at nipple height...
	Mean depth at nipple height....

OBSERVATIONS

Color of eyes.....	Lips.....
Color of hair.....	Chin.....
Nature of hair.....	Body and limbs.....
Nose.....	
Nasal septum.....	Dynamometric pressure r. hand.....
	l. hand.....

IV. MATERIAL FOR FUTURE SCIENTIFIC RESEARCH

Together with the preceding suggestions the Committee pointed out the opportunities and need of gathering scientific data and especially valuable specimens at the base hospitals. These suggestions were worded as follows:

The organization of the new Army will afford important opportunities for additional scientific research and the collection of data and specimens which should be utilized as far as practicable. Efforts in this direction were made in the Northern Army of the United States during the Civil War; the results are embodied in three volumes of data by Baxter and Gould, and in the collections of the Army Medical Museum. According to available information, more or less extended scientific researches are being conducted and illustrative collections made at the present time in connection with nearly all the armies of Europe.

The United States Army will include not only men of many nationalities, but also those of different races, such as the Indian, Negro, Filipino, and possibly Japanese and Chinese. Even under the best hygienic conditions and without actual participation in war a certain proportion of these must be expected to become ill and die in hospitals. The

bodies of such dead cannot, as in peace, be transported hundreds or thousands of miles, perhaps, to their friends, but must be cremated or buried in the vicinity of the hospitals. These bodies offer a valuable opportunity for postmortem determinations, such as the cause of death as found at autopsy, the weight of the different internal organs, etc., and also for assembling specimens which would be of the utmost value to future pathological, anatomical and anthropological investigation. The Army Medical Museum and the United States National Museum would gladly take charge of the preparation and distribution of such material.

For the above purposes it is requisite that in each of the more important hospitals one member of the medical staff, preferably a pathologist or an assistant pathologist, be designated to gather needed records and specimens; and it is earnestly recommended that such a detail be made immediately on the establishment of each large army or navy hospital.

Shortly after submitting the above, the Secretary of the Committee made the additional recommendation to the Council that a specially well qualified anatomist or physical anthropologist be officially attached, if possible, to the Medical Service of the War Department and be commissioned to France for the purpose of making scientific observations and collecting suitable material in the hospitals in France.

ADDITIONAL SUGGESTIONS

During the latter part of 1917 the Chairman of the Committee transmitted to the Research Council some additional suggestions, to the following effect:

V. THE NEED OF PRESERVATION OF ANCIENT HUMAN REMAINS, THAT MAY BE DISCOVERED BY THE MEN OF THE U. S. ARMY IN EUROPE

France³ was a home of early man throughout a large part of the period of his evolution. In many parts of France archeological and skeletal remains of ancient man have been discovered, both before and during the war, and many doubtless lie yet in the soil. During the excavations by our men more or less ancient human remains may be repeatedly discovered; and as the scientific value of such objects is exceedingly great steps should be taken for their preservation. The medical men

³ The same applies to Belgium and to some extent also to Italy.

accompanying the Army could materially assist in this matter, without interference with their regular duties, by bearing the above facts in mind and calling them to the attention of the regular officers and men of the Army.

The rules to follow are simple and few in number; they are:

1. If seemingly ancient skeletal or other remains of man are encountered and circumstances permit, they should be carefully collected in their totality, even to fragments;

2. Save also whatever animal bones may be found with the human remains;

3. Note the locality and depth of the specimens from the surface, with any other facts that may seem of importance, and attach this information with the name and home address of the officer who supervised the collection, to the specimen; and

4. Pack the specimens in any convenient box and address "To The Quartermaster General, U. S. A., for the U. S. National Museum."

VI. RACIAL PROBLEMS

The final recommendations made to the National Research Council related to the proper coöperation of the Committee with the eventual U. S. Peace Commission, in the many questions of race, etc., which are bound to come up during the final negotiations. The political fate of many of the smaller countries in Europe must be decided at these conferences. They include Belgium, Alsace-Lorraine, Poland, Lithuania, Galicia, Bohemia, the Balkans, Turkey, Arabia, Armenia and others. The Germans will undoubtedly come well prepared to claim everything to their advantage; and unless they can be confronted by anthropological facts and expert presentations of opinion they may readily gain in their unjust contentions.

As a supplement to the above recommendations the Committee also considered favorably and reported to the Council the proposition to establish a special Journal devoted to Physical Anthropology, which would pay special attention to the many anthropological problems arising in connection with or as the results of the war.

CONCLUDING REMARKS

The above statement shows in brief form the activities of the Committee on Anthropology up to the beginning of 1918. As a result of its recommendations the physical requirements for admission to the

United States Army have been reduced. In other directions its suggestions have so far borne little fruit, but this is doubtless due in large measure to the vast amount of more urgent matters connected with the organization of a great army for the conflict abroad. The Committee has endeavored to make it clear on the one hand that Anthropology can find in the present crisis a wide field for usefulness of an immediately practical nature, and on the other, that important opportunities for scientific observation and research are afforded by the exigencies of the great conflict, the utilization of which must prove of ever increasing value as the centuries pass.

It is only just in this place to state that the various propositions herein embodied were formulated by the Secretary of the Committee.

ANTHROPOLOGICAL ACTIVITIES IN CONNECTION WITH THE WAR IN ENGLAND

(Based on information furnished the Secretary of the American Committee on Anthropology by Prof. Arthur Keith, Secretary of the English Committee)

On March 22, 1916, at the instance of the Royal Society of Great Britain, a conference was held with representatives of the leading scientific societies, with the result that there was established a *Conjoint Board of Scientific Societies*, corresponding to the National Research Council of the United States. One of the chief objects of this board was "to take such action as may be necessary to promote the application of science to our industries and to the service of the nation." Ultimately forty-eight scientific societies and corporations came to be represented on the Conjoint Board.

At the first meeting of the Conjoint Board, on July 20, 1916, the urgency and importance of a physical survey of the people was discussed. The board decided to ask the Royal Anthropological Institute "to submit a report to the Executive Committee of the Board of Scientific Societies on the desirability of a physical survey of the British people." The council of the Institute reported that such a survey was urgently needed, its reply being based chiefly on the report of the Inter-Departmental Committee on Physical Deterioration (1904).

Thereupon the Executive Committee of the Conjoint Board of Scientific Societies constituted an "Anthropological Survey Subcommittee" to advise the board (1) as to whether or not such a survey was desirable; (2) if it were desirable, how it could best be carried out; and, (3) how far the facts yielded by such a survey were likely to serve a national purpose. The members of the subcommittee thus appointed were: Maj. Leonard Darwin, Col. James Galloway, Dr. P. Chalmers Mitchell, Prof. G. Elliot Smith, Prof. Karl Pearson, Prof. Arthur Thomson, and Prof. A. Keith.

It soon became apparent, however, that "the labors of the subcommittee would be in vain unless it obtained the advice and coöperation of all those departments of the Government which were directly concerned with the health and physical welfare of the people." A recommendation to this effect was acted upon favorably by the Govern-

ment authorities, and the following were added to the Subcommittee on Anthropology: Sir Arthur Newsholme, representing the Local Government Board; Sir George Newman, representing the Medical Department of the Board of Education; and Dr. T. H. C. Stevenson, representing the Office of the Registrar General.

The first and most important question that came up before the subcommittee was that of the anthropological survey, and "it was clearly the opinion of every member present that such a survey was needed." The subcommittee proceeded to define the undertaking.

The next weighty question was, How was the survey to be made? But little guidance could be obtained from the surveys made in other countries. In the final phase of the Civil War in the United States stature measurements were made of 1,232,256 recruits who joined the northern armies (1863-64). The color of hair and eyes was noted in 668,360. Records of nationality were kept. The men who measured the American recruits had not been trained to make exact observations in a uniform system. Yet the data thus accumulated have proved of great and permanent value. In Great Britain no systematic survey of the physique of the nation has been made.

Studies for the purpose of obtaining exact information regarding the physical characters of their children and men have been made in France, Belgium, Switzerland, Germany, Sweden, and Russia; but in no case was a systematic physical examination of representative parts of the whole population carried out; and in the majority of cases these surveys were local and individual efforts. "The real lesson which may be learned from surveys made in other countries was that a survey which is to yield the data we stand in need of must be made under the aegis of a central authority—with right of surveying the population of certain specified areas of the country."

The only survey which promised to prove helpful to the subcommittee was that carried out in Italy in 1879-1883. In 1879 Dr. Guida proposed that the 1859 class of recruits, called up in 1879 at the age of 20, should have certain measurements taken and physical characters observed during their five years of service.¹ The scheme was adopted by the authorities of the Italian army. For the purpose of recruiting, Italy was divided into 1,719 areas, each of which yielded an average of 174 recruits, the total number surveyed being just under 300,000. The following observations were made:

¹ Dr. Ridolfo Livi: "Antropometria Militare." Rome, 1896, 1905.

- | | |
|--------------------------------------|------------------------------|
| 1. Hair—color and texture. | 8. Nose—shape. |
| 2. Eyes—color. | 9. Mouth—shape. |
| 3. Skin—color. | 10. Chin—development. |
| 4. Teeth—condition. | 11. Face—shape. |
| 5. Head—greatest length and breadth. | 12. Stature. |
| 6. Eyebrows—color. | 13. Weight. |
| 7. Forehead—shape. | 14. Circumference of thorax. |

The survey was made at recruiting stations. There is no reason to believe that the officials at the recruiting stations had been trained in a uniform system of measuring and observing, nor is it evident that each station was supplied with a uniform set of instruments and standards. Apparently observations were not always made by medical officers; for injunctions are given that the head measurements are to be made only by them. Of the 14 observations made on each recruit, only the three last, relating to the stature, weight, and thoracic circumference, can be regarded as yielding exact data. In all other instances the observer had to formulate and apply his own individual standard. Imperfect as the Italian survey may be in some respects, there can be no doubt that it yielded information of national value. Italy thereby obtained a basis on which, when another survey is carried out, an exact estimate of the physical progress of the Italian people could be made. She obtained, for the first time, an exact picture of the distribution of the various physical types of manhood throughout her territories. She obtained data facilitating an inquiry into the influence of race and of environment in determining the physical state of the people.

The Machinery of a Survey.—The Inter-Departmental Committee of 1904 favored the scheme of survey placed before it by the late Prof. D. J. Cunningham and the late Mr. John Gray. That scheme was based on the constitution and methods of the Geological Survey. A National Bureau was to be created, consisting of (1) a Consultative Committee of three expert anthropologists, one from England, one from Scotland, and one from Ireland, the appointments to be honorary, (2) a Director and Deputy Director; (3) a Staff of Surveyors. Professor Cunningham and Mr. Gray preferred a permanent staff of trained surveyors; the Inter-Departmental Committee preferred the employment of part-time surveyors.

Since the above proposals, conditions have materially changed and new plans for the survey have become a necessity. There is one matter, however, "about which there can be no difference of opinion: Those who make the measurements or observations must all be trained

in a common system, and that system, once adopted, must be most rigidly adhered to by every one taking part in the survey. No matter whether the observer is a medical man or not he must undergo a training and pass a test in the method adopted by the subcommittee."

Under the new Medical Boards of England every recruit will be examined and have certain anthropological records made concerning him—his height, weight, chest measurement, color of hair, and color of eyes—but examinations for the purposes of the survey must be more detailed and carried on especially on representative samples of the population of all the districts into which Great Britain is divided.

The size of these samples is a matter to be settled by statisticians. The late Mr. Gray was of the opinion that no survey would be satisfactory which included less than 2 per cent of the whole population. That is probably too low an estimate; a 5 per cent basis would prove more satisfactory. Of the 16,000 men between the ages of 23 and 41 in the city of Aberdeen we should probably have to take a sample of 800 to obtain a true picture of the physical condition of the whole group. They would have to be drawn in equal proportions from certain defined areas of the city.

As regards the country area of Aberdeen a somewhat different method would have to be adopted. The city sample is representative of its adult military manhood, but were samples to be gathered from all over the country area and embodied into a single group, there would be danger of missing one of the chief objects of a survey—the discovery of the distribution of racial or physical types. In the country part of the Aberdeen area the natural groupings lie along the river valleys and adjacent uplands of the Deveron, Ythan, Don, and Dee. Three districts could be chosen and defined for survey—the Deveron, the Don-Ythan, and the Dee districts—which would be sufficiently large to yield representative groups. Six hundred men from each of these three districts should suffice to give reliable information concerning the anthropological characters of the manhood of each area. Along the coast is distributed a fishing population which certainly should receive separate treatment. Under the scheme here submitted it is presumed that a careful anthropological examination of 800 city men, 1,800 country men, and 400 fishermen would suffice (1) to provide accurate information concerning the physical condition of the men of the area; (2) to show the distribution of physical or racial types; and (3) to give a basal standard for comparison with the results obtained by surveys in the future. This, perhaps, is the most important object of the survey.

Survey of Growth.—So much for the manhood of the area taken as an example. Perhaps as important, or even more important for the objects the subcommittee has in view, is an investigation of the stages of growth which culminate in the finished element—mature manhood. It should not be necessary to examine children and youths in every stage of growth. In schools under the jurisdiction of the Board of Education, children undergo a systematic medical examination at two stages: in their ninth year and again in their thirteenth year. As the law now stands every youth has to present himself for examination by the Medical Boards of the Ministry of National Service at the commencement of his nineteenth year. It would therefore be most convenient to select these three stages of growth for survey—in the ninth, thirteenth, and nineteenth years. Samples should be taken from the same areas and the same population as yielded the adult samples. In the city of Aberdeen there are about 1,800 boys in their ninth year, approximately the same number in their thirteenth year, and 1,650 in their nineteenth year. It may be necessary to measure as many as 800 boys in each of these three classes, the samples being selected from the same districts of the city and in the same proportions as the adults. In the Aberdeen country area, groups of 800 from each of the three districts selected for a manhood survey could not be obtained. But each district could provide groups of 400 to represent the three selected stages of growth—the ninth, thirteenth, and nineteenth years. A “growth” survey of the Aberdeen area would thus involve measurements of 6,000 individuals; 2,400 in the city and 3,600 in the country.

An ideal survey should also be extended to girls and women. At present there would be no difficulty in obtaining measurements of schools girls and a way may be found of bringing young and adult women under the scope of the survey. As matters stand at present, there are no means of extending a survey to women.

The Aberdeen area, which has been chosen as an example, is one of the 90 areas into which Great Britain has been divided by the Ministry of National Service for the purpose of grading the manhood of the nation. The difficulties and problems it presents are representative of other areas. Its population is approximately 400,000; in that respect it is an average area. For an anthropological survey of its male population it is proposed that 8,000 individuals should be examined. A survey of all 90 areas will therefore entail the examination of 720,000 or, say, 800,000 individuals. Every area, both city and country,

would require to be divided into defined districts and certain of these districts should be selected for survey. In certain areas opportunities would be found for the survey of men engaged in special occupations.

Measurements and Observations.—In selecting a list of the characters to be surveyed the subcommittee was guided by the following necessities: (1) They must be few in number; (2) they must be suitable for exact and easy measurement; (3) they must be such as will yield definite evidence of the physical condition of the body.

The following list was recommended for favorable consideration:

Measurements

Body:	Face:
Weight.....	Submental point-nasion.....
Stature.....	Diam. bizygom. max.....
Height sitting.....	
Length of span.....	
Head	
Length.....	Girth of chest.....
Breadth.....	Antero-posterior diam. of chest.....
Height.....	Lateral diam. of chest.....

Observations

Color of eyes.....
 Color of hair.....
 Color of skin.....

In restricted areas a dental survey should be added, entailing six series of observations in each individual case.

The above instructive and valuable report of the British subcommittee ends with the following recommendation, the importance of which will be evident to all men interested in these matters:

“It is desirable that the records made in Great Britain and America should be conducted so as to give results which are directly comparable. The Secretary (Dr. Keith) has therefore communicated with those who have made themselves responsible for the survey in the United States.”

LITERATURE¹

I. ANTHROPOLOGY IN GENERAL; RESEARCH

THE ROYAL ANTHROPOLOGICAL INSTITUTE: How can the Institute best serve the needs of Anthropology. By Keith (Arthur)—*J. Anthr. Inst.*, London, 1917, XLVII, 12-30.

Able and instructive epitomized contribution to the history of Anthropology in Great Britain. In reading the paper one is struck by the remarkable differences in the development and present condition of Anthropology in England and in the United States. In England, there is one, organized, centralized effort, sustained since 1843; in the United States, through a larger part of the same period, some great but disconnected advances, then a development of independent, institutional centers of activities, and that of local Societies, with later a general association meeting once a year. In England a continued and prominent participation in anthropological activities of the foremost men in anatomy; in the States a gradual loss of this most desirable element through its new interests in biology. In both countries anthropology forges ahead; but the geographical conditions and general streams of scientific activities differ, and progress follows not the same avenues.

For the future, Dr. Keith recommends all possible encouragement and co-ordination of effort in anthropological research; the furthering of instruction; the establishment of closer relationships between the Institute and the Government; and the increasing as far as it may be feasible of the efficiency of the meetings and publications.

EVOLUTION; MAN'S ORIGIN; EARLY MAN

THE FUNDAMENTAL NATURE OF POPULATION, By Trotter (Spencer), *The Scientific Monthly*, N. Y., March, 1917, IV, 263-73.

Population "is to be regarded as any point in the flow of those hereditary qualities that constitute race or species;" it is "an organism that has developed from the same basic principles and under the same laws as other organisms;" and is drifting in the ocean of the Infinite "toward some end, undoubtedly, but nevertheless drifting, not moving definitely from any collective sense of its own, with an end in view."

The paper is essentially sociological.

ADAPTATION AND ADAPTABILITY. By Doncaster (L.)—*Eugenics Rev.*, London, Oct., 1917, IX, 213-17.

"The old idea that the germ-cells are completely shut off from any

¹ Reviews by Associate Editors will be initialed; those not initialed are by the Editor-in-Chief.

influence coming from the body is no longer tenable, and though the influence of purely somatic 'acquirements' on the germ-cells is probably non-existent, this does not necessarily apply to conditions which affect the whole body in every part, such as toxins and anti-toxins circulating in the blood, the secretions of glands, and so forth. The germ-cells, like other cells, can hardly fail to react to such influences, and if they react by any change in the constitution of their substance, that change, one must suppose, may be transmitted to the next generation. If, however, we may infer from the facts of immunity shortly sketched above that the changes produced are generally of a truly adaptive nature, then one would expect that the germ-cells must also adapt themselves to functional changes, and that in this way adaptive variations, germinal and therefore heritable, might come into existence."

OBSERVED CHANGES IN HEREDITARY CHARACTERS IN RELATION TO EVOLUTION. By Jennings (H. S.)—*J. Wash. Acad. Sc.*, Balt., May 19, 1917, VII, 281-301.

Lucid, excellent treatise on present evidence concerning the processes of evolution. While of general biological nature, it deals with conditions that must apply equally to human evolution. The author summarizes as follows:

"1. Experimental and observational study reveals that organisms are composed of great numbers of diverse stocks differing heritably by minute degrees.

"2. Sufficiently thorough study shows that minute heritable variations—so minute as to represent practically continuous gradations—occur in many organisms; some reproducing from a single parent others by biparental reproduction.

"3. The same thing is reported from paleontological studies.

"4. On careful examination we find even that the same thing is revealed by such mutationist work as that on *Drosophila*; single characters exist in so many grades due to minute alterations in the hereditary constitution as to form a practically continuous series.

"5. It is *not* established that heritable changes must be sudden large steps; while these may occur, minute heritable changes are more frequent.

"6. It is *not* established that heritable variations follow a definite course as if predetermined; they occur in many directions.

"7. It is not established that all heritable changes are by disintegration; although many such do occur, they cannot be considered steps in progressive evolution from the visibly less complex to the visibly more complex.

"Evolution according to the typical Darwinian scheme, through the occurrence of many small variations and their guidance by natural selection, is perfectly consistent with what experimental and paleontological studies show us." This appears to the author "more consistent with the data than does any other theory."

THE ORIGIN AND EVOLUTION OF LIFE. By Osborn (Henry Fairfield), 8°, N. Y., 1917, 1-353.

In the words of the author, the volume outlines "the initial steps toward an energy conception of Evolution and an energy conception of Heredity, and away from the matter and form conceptions which have prevailed for over a century. The first half of this volume is therefore devoted to what we know of the capture, storage, release, and reproduction of energy in its simplest and most elementary living phases; the second half is devoted to the evolution of matter and form in plants and animals, also interpreted largely in terms of energy and mechanics.

. We are not ready for a clearly developed energy conception of the origin of life, still less of evolution and of heredity; yet we believe our theory of the actions, reactions, and interactions of living energy will prove to be a step in the right direction."

Man is considered only indirectly. The author deals with the laws and ways of organic evolution in general. The volume advances perhaps no strictly new and striking hypotheses, but presents in many respects the most modern views on the subject, together with the results of the life work of the author, who, it is hoped, will some day give us his views relating more exclusively to human evolution and differentiation.

The book bears the usual high stamp of Osborn's publications, especially in reference to the lucidity of style and profusion as well as excellence of illustrations.

THE THEORY OF EVOLUTION. By Scott (William Berryman)—12mo., N. Y., 1917, 1-183.

Admirable non-technical "review of the evidence upon which the doctrine of evolution is founded." While of a general biological nature, the book may be read with much profit by every student of anthropology. Its scope is best illustrated by citing the contents:

- I. Present Status of the Question.
- II. Evidences for the Theory—Classification, Domestication and Comparative Anatomy.
- III. Evidence from Embryology and Blood Tests.
- IV. Evidence from Palaeontology.
- V. Evidence from Geographical Distribution.
- VI. Evidence from Experiment—Conclusion.

THE METHOD OF EVOLUTION FROM THE VIEWPOINT OF A GENETICIST. By Shull (A. Franklin)—*Am. Naturalist*, Lancaster, 1917, LI, 361-369.

Biological, but of considerable general interest to anthropology. Author adheres firmly to the principle "that evolution in past time is to be explained by phenomena that occur to-day," and inclines strongly to the belief that evolutionary changes are independent of the environment.

ARBOREAL MAN—Editorial, *J. Hered.*, Wash., Dec., 1917, 531-542.

Extended editorial review and comment on Dr. Jones' book on the subject, with a number of additional and interesting illustrations. Among these is that of a thirty-day old negro baby hanging by his hands from a rod.

PROBABLE RELATIONS OF CLIMATIC CHANGE TO THE ORIGIN OF THE TERTIARY APE-MAN. By Barrell (Joseph)—*The Scientific Monthly*, N. Y., Jan., 1917, IV, 16-26.

The author calls attention to recurrent periods of semi-aridity over parts of the globe in the course of former geological epochs, and to the influence of such periods on organic evolution. He then suggests that a similar climatic cause acting upon our simian ancestors may have been a controlling factor in human evolution. His main hypothesis is "that the compulsion of increasing aridity in Miocene times, by isolating anthropoids north of the Asiatic mountain systems and reducing the forests there to savannas and open plains, was the primary cause in the differentiation of the ape-man from the apes and thus was fundamental in the initiation of human evolution."

SOBRE UMA FORMA CRANIANA ARCAICA. By Correa (A. A. Mendes)—*Sep. d. Anais Scient. da Faculd. de Medec. do Porto*, Porto, 1917, IV, no. 1, 1-83.

Deals with hipsistenocephaly, showing great antiquity and wide distribution of the character. The formulated conclusions are, it is to be hoped, of only a preliminary nature. Appended to the article are interesting tables and curves, though the latter are too condensed and reduced; and there is a bibliography.

EVOLUTION OF THE HUMAN FACE. By Gregory (William K.) (Lecture delivered before the Linnaean Society of N. Y., Feb. 27, 1917)—*Am. Mus. J.*, N. Y., Oct., 1917, XVII, 376-88.

A general discussion of the subject. "The human face has been derived from large, powerful apelike forms with heavy jaws, massive jaw muscles and a sharply retreating forehead." In spite of the readjustments following the assumption of the upright gait and the change in food habits, "the differences between the primitive ape skull and the human skull are essentially differences of proportion and of degree rather than of kind." "The living apes and men have evolved from a remote and as yet undiscovered common ancestor that lived perhaps in the middle period of the Age of Mammals." "The living apes, because they have stayed in the ancestral habitat, have retained the greater part of the ancestral man-ape characters, and the ancestral pattern of the human face may still be seen in a little changed state in the faces of young female gorillas and chimpanzees." There are a number of interesting illustrations.

THE PILTDOWN SKULL. By Nuttall (T. E.)—*Man*, May, 1917, no. 59 p. 80.

Mild criticism of Dr. Keith's as well as Dr. Smith Woodward's and Dr. Elliot Smith's reconstructions and views concerning the Piltdown skull. No new hypothesis advanced.

UN PRETESO HOMINIDA MIOCENICO. By Sera (G. L.)—*Rivista di Scienze Naturali "Natura,"* Pavia, 1917, VIII, 149-173. LA TESTIMONIANZA DEI FOSSILI DI ANTROPOMORFI PER LA QUESTIONE DELL'ORIGINE DELL'UOMO. By same author. *Atti della Società Italiana, di Scienze Naturali*, Pavia, 1917, LVI, 25-156.

Contributions of importance relating to the phylogeny, generic relations and relations to man of the larger fossil apes whose remains have so far been discovered. The studies, in consequence of the defective condition of the remains, are based almost wholly on portions of mandibles and especially on the teeth. In the author's opinion the recently discovered fossil forms in India, more particularly the *Sivapithecus*, are not true *Hominidae*. The nearest to man, so far, appear to be certain European forms of *Dryopithecus*. The ancestry of the negroid races, however, may possibly be referred to the *Pro-pliopithecus*. This would render necessary a phylogenetic dissociation of the human family, for which the time can scarcely as yet be considered ripe.

PRELIMINARY NOTE ON THE ANCIENT HUMAN SKULL-REMAINS FROM THE TRANSVAAL. By Haughton (S. H.) Notes by R. B. Thomson and L. Peringuey—*Trans. Royal Society South Africa*, Cape Town, 1917, VI, part 1, 1-13, plates I-X.

A description of the so-called *Boskop* skull and bones. The remains which are mineralized were discovered, in 1913, at an approximate depth of 4 feet 6 inches below the level of the ground near the left bank of the Mooi River in Transvaal. None of the specimens were found *in situ*, but there is little doubt as to their exact position in the ground.

"An undisturbed section showed: Soil, 1 foot; subsoil, 4 feet 3 inches; breccia ('oukclip'), 2 feet 9 inches, as far as the section was taken. The soil was a fairly dark rich soil which had been cultivated for a number of years. It gradually gave place to the subsoil which, in turn, graduated into the lateritic 'oukclip' breccia. The subsoil contained in its upper part a few scattered irregular lumps of breccia, but as it was traced downwards these masses became more plentiful until ultimately the loose material was replaced entirely by a stiff breccia. At the 4-foot 6-inch level the lumps of breccia were fairly plentiful, and the whole of the front of the skull-cap, most of one side, and all the inner surface were encased in a matrix of this material. The lateritic breccia consists of small pebbles and pellets of chert and sandstone set in a ferruginous and occasionally siliceous matrix, with here and there a few small, irregular, drusy cavities. The thickness of this laterite is not known, as excavations in it could not be conducted to a greater total depth than 8 feet, owing to the flooding of the hole by underground water."

No really great antiquity is claimed for the skull and bones, the main reason for the special attention which the bones received being evidently their state of mineralization. The skull-cap and bones resemble closely those of the Bantu negro. Certain parallelisms with the Cro-Magnon type of skull are probably of secondary importance. There are no Neanderthaloid features. The authors wisely abstain from attributing to the specimens any more importance than they deserve.

The illustrations of the skull-cap show clearly negro features.

RESIDUI DI UN TIPO PROTOETIOPICO IN EUROPA. By Giuffrida-Ruggeri (V.).—*Annaes da Academia Polytechnica do Porto*, Coimbra, 1917, XII, repr. pp. 1-3.

The author suggests that certain old dolichocephalic crania with relatively high nasal index from a number of "marginal" localities in Europe along the Mediterranean, belong not to the Mediterranean but to an equatorial type, which he names Proto-Ethiopic. The evidence as yet, however, does not appear to be conclusive.

HUMAN ONTOGENY: EMBRYOLOGY; CHILDHOOD; ADOLESCENCE; DECLINE; DEATH

MEASUREMENTS OF BABIES. Anthropometric Table. Male and female children from six to forty-eight months old. Based on the measurements of ten thousand four hundred and twenty-three normal babies in thirty-one states. Compiled for the American Medical Association by Frederick S. Crum, Assistant Statistician, The Prudential Insurance Company of America. Printed by the Company, Newark, N. J., 1917, 4 pp.

The averages contained in this table are intended as standards for ordinary rather than scientific purposes, wherefore the figures are given in inches and are accompanied by no explanations. The measurements, as learned later, were taken by many not specially trained observers, and have little claim to precision. Their main object was to provide parents, nurses, and the medical practitioner with a table of standards of height, weight, circumference of head, chest and abdomen, diameters of chest, and length of arm and leg, on babies of from six to forty-eight months of age. It is regrettable that the many undertakings of this sort in this country can not be carried on under definite regulations and with sufficient accuracy to be useful to science, as well as to the parents and others interested in children's welfare. There is a hope, however, that steps to this effect may soon be taken by the Government Children's Bureau, at Washington.

MATERNAL MORTALITY—from all conditions connected with child-birth, in the United States and certain other countries. By Grace L. Meigs, M.D., U. S. Dept. Labor, Children's Bureau, Wash., 1917, 1-66.

"In 1913 in this country at least 15,000 women, it is estimated, died

from conditions caused by childbirth; about 7,000 of these died from childbed fever, a disease proved to be almost entirely preventable, and the remaining 8,000 from diseases now known to be to a great extent preventable or curable. Physicians and statisticians agree that these figures are a great underestimate.

"In 1913 the death rate per 100,000 population from all conditions caused by childbirth was little lower than that from typhoid fever; this rate would be almost quadrupled if only the group of the population which can be affected, women of childbearing age, were considered.

"In 1913 childbirth caused more deaths among women fifteen to forty-four years old than any disease except tuberculosis.

"The death rate due to this cause is almost twice as high in the colored as in the white population.

"Only 2 of a group of 15 important foreign countries show higher rates from this cause than the rate in the registration area of the United States. The rates of 3 countries, Sweden, Norway, and Italy, which are notably low, show that low rates for these diseases are attainable.

"The death rates from childbirth and from childbed fever for the registration area of this country apparently are not falling to any great extent; during the thirteen years from 1900 to 1913 they have shown no demonstrable decreases. These years have been marked by a revolution in the control of certain other preventable diseases, such as typhoid, diphtheria, and tuberculosis. During that time the typhoid rate has been cut in half, the rate from tuberculosis markedly reduced, and the rate from diphtheria reduced to less than one-half. During this period there has been a decrease in the death rate from childbirth per 1,000 live births in England and Wales, Ireland, Japan, New Zealand, and Switzerland."

THE BIOLOGY OF TWINS. By Newman (Horatio Hack tt)—12mo, Chicago, 1917, 1-185. Review in *J. Hered.*, Wash., June, 1917, 243-8.

The small book deals with the biological nature of the phenomenon of twinning, and with the heredity of the process in animals as well as man. Main attention is given to the twins in armadillo which in the opinion of the author furnish the key to the mechanics of human twinning.

THE UTILITY OF DEATH. By Pike (F. H.)—*J. Hered.*, Wash., May, 1917, VIII, 195-199.

Evolution could not take place without it, because the higher forms of life are so specialized that they cannot change much in a single lifetime—death, therefore, is an adaptation for the benefit of the species—the trend of evolution.

HEREDITY; EUGENICS

COEDUCATION AND EUGENICS. By Banker (Howard J.)—*J. Hered.*, Wash., May, 1917, VIII, 208-214.

The report is based on the vital statistics of the graduates of Syracuse University, a coeducational institution. "The finding of previous

investigators has been, in general, that college graduates show a declining rate of fecundity to a point where they are not even reproducing themselves, and that the record for the graduates of women's colleges is by far the lowest." It was supposed that a coeducational institution would make a better showing, but the results obtained presented by the writer are disappointing.

Women graduates of Syracuse University have very low marriage and birth rates—those of men graduates are much higher. Colleges receive perhaps an abnormal type of woman and nature of education can effect little change in her unmarriageable character.

INHERITANCE OF STATURE. By Davenport (Charles B.)—*Genetics*, July, 1917, II, 313–89.

A well-written and valuable contribution to our knowledge of the workings of heredity with such relatively complex feature as the human stature. If it does not satisfy completely, it is partly due to the nature of the data used, which were gathered "by many hands" and a proportion of which, in the words of the author himself, were "not scientifically precise;" and partly to the fact that the solution of the larger questions underlying the problem, such as the causes of the variation in stature from group to group of humanity, the deep significance of its normal fluctuation with its astonishing regularity, the limitations of progress in both upward and downward directions and its modifiability by environmental conditions, has scarcely been advanced. But it may be unreasonable to wish for so much while precise studies on the subject are still in their infancy. Dr. Davenport's main conclusions, some of which connect with those of other authors while few are perhaps more or less preliminary in nature, are as follows: "One of the factors that determines variation in stature is probably the variation in age of onset of puberty. Parents of similarly deviant stature have on the average less variable offspring than those of one short and one tall parent. The offspring of two tall parents are less variable in stature than those of two short parents.—When both parents are 'tall' or 'very tall,' and of tall stock, practically all the children are tall or very tall. When both parents are 'very short' or 'short,' and of short stock, all children are short or very short. 'Short' parents may, and frequently do, carry germ-cells which lack the shortening factors, while in tall parents the gametes are more nearly homogeneous and all lack most of the shortening factors. When the parents are much below the average in stature the offspring regress toward mediocrity; but when the parents are much above the average in stature there is no (or little) filial regression. The least variable offspring are those of two tall parents; the most variable those of parents that are abmodal in opposite directions. The progeny derived from matings of similars are less variable than those derived from matings of dissimilars—a result which indicates that parents of all classes are somewhat heterozygous. Medium stature may appear in the progeny of a tall by short mating, but the majority of persons of medium stature in this country belong to a medium biotype.

Shortness is due to certain positive factors that inhibit growth of the various parts. Persons of similar stature tend to marry each other; and extremes are more particular in this respect than those of medium statures. While 'growth-as-a-whole' factors are present, yet there is a large degree of independence in the variability of the four segments of stature, considered in this paper. . . . This independence in variability of the segments of stature makes impossible any simple 'Mendelian' laws of inheritance of stature as a whole. In the segments of stature (as contrasted with stature as a whole) we approach a condition of relatively few factors for the character. There are families (potential biotypes) in our population characterized by idiosyncrasies in length of each of the segments of stature. There is evidence that the segments of stature are to a certain extent separately inheritable. The inheritance of proportional length of the segments of stature is as evident as the inheritance of absolute differences. Here, too, it is obvious that proportional shortness of any segment depends on more than one shortening factor—just how many cannot be said. It is probable that in all forms of dwarfing there are multiple dominant inhibiting factors. In the case of giants, when both parents are tall all of the children are tall; this indicates that the factors for tallness are mostly recessive—probably due to the absence of inhibitions to prolonged growth."

INFANT MORTALITY. By Duncan (Beatrice Sheets) and Emma Duke—U. S. Dep't. Labor, Children's Bureau, Wash., 1917, 1-134.

Report on studies of considerable interest to eugenics as well as anthropology. Manchester is an industrial city, with predominance of textile manufactures, and known high infant mortality. It was the third locality chosen by the Children's Bureau for a thorough study of the subject, the other being Johnstown, Pa., the steel city, and Montclair, N. J., a suburban community (Bureau Publications Nos. 9 and 11, 1915). The infant mortality at Manchester was found considerably higher than that in the registration area of the United States in general, and than that of New York City. The cause of the unfavorable conditions were found to be partly environmental—bad housing and insanitary surroundings; economical—low earnings of the father and gainful employment of the mother; racial—babies of foreign born mothers had a higher death rate than those of native mothers, but this was found to be due largely to the high death rate among babies of the French-Canadians; large families—in general the later born children showed a greater tendency to a higher infant mortality rate than those earlier born; and artificial feeding—this being accompanied by a higher infant mortality rate than breast feeding.

INFANT MORTALITY. The editor of the *Journal of Heredity* (Feb., 1918, p. 62) combats the tacit assumption of Beatrice S. Duncan and Emma Duke in Publication No. 20 of the Children's Bureau, U. S. Department of Labor (Infant Mortality, Wash., 1917), that the high

infantile death rate (to 1 year) shown by the manufacturing town of Manchester is due to the bad housing and insanitary environment of the factory workers. Pointing out that, as Ploetz has shown, there is in royal and related families, whose sanitation is beyond reproach, a close correlation between age of father at death and per cent of children who die in first five years, the editor warns against the danger of publications such as this (and others) of the Children's Bureau.—C. B. D.

EUGENIC FACTORS IN JEWISH LIFE. By Fishberg (Maurice)—*The American Hebrew*, Jan. 26, Feb. 2, 9, 16, 23, 1917, repr. 31 pp.; also, in abstract, *J. Hered.*, Wash., Dec., 1917, 543-49.

"It is well known that the proportion of persons of marked ability, of individuals who have gained distinction in any line of human endeavor, is greater among the Jews than among the peoples of other faiths in whose midst they live."

It is also "a matter of common observations that the Jews are physically puny—a large proportion are feeble, undersized; their muscular system is of deficient development with narrow, flat chests, and of inferior capacity. They make the appearance of a weakly people, often actually decrepit, if only because of the proverbial bent spine, the 'Ghetto bent.' Moreover, physical defects, congenital and acquired, are notoriously common among them." In addition the proportion of mental defectives, idiots, imbeciles, etc., is decidedly higher among Jews than among others; and the same is true of other degenerative conditions such as blindness, color-blindness, deaf-mutism, insanity, etc. Therefore plainly "it must be acknowledged that the modern children of Israel, in spite of their phenomenal vigor in other respects, show a larger proportion of physical and mental defectives than any other civilized religious, social, or ethnic group of people." A similar contrast exists sociologically. There are found among the modern Jews "an excessive proportion of poor and destitute dependents, as well as a larger ratio of economically prosperous, and even millionaires, than their total number would lead us to expect."

What are the causes of these peculiarities among the modern Jew? "Race" cannot be considered the cause, for to-day there is but little racial homogeneity among the Jews.

In the author's opinion the conditions are due to a peculiar combination on one hand of eugenic and on the other of dysgenic features that have acted upon the Jews for many generations.

"The extraordinary number of exceptionally capable and talented Jews, as well as the excessive number of physical and mental defectives among them, owe their origin to a great extent to special and peculiar selective agencies. Their marriage laws and customs were effective in securing the augmentation of the favored stock, in increasing the number of individuals who are inherently above average in mental, intellectual and moral qualities. Giving preference in marriage to the scholar, encouraging him in his efforts, and often endowing him, the Jews have followed sane ideals in respect to marriage and procreation

of favored stock. But some features of Jewish life, habits and customs have also been effective in enhancing the multiplication of the physically and mentally defective, and as a result we have at present an excessive number of persons who are of inferior stock among them. Especially must be emphasized their methods of distributing relief to the poor and afflicted as a dysgenic agency, responsible for a considerable proportion of the failures encountered among the modern Jews. However, with the recent adaptation of the mode of life, habits and customs of their non-Jewish neighbors, these peculiarities are gradually being effaced. Whether the loss thus sustained in the number of capable Jews is compensated by the decrease in the number of defectives, depends on the point of view."

JEWISH EUGENICS. By Reichler (Max, Rabbi)—12mo., N. Y., 1916, 1-19.

The Rabbis recognized the fact that both physical and psychical qualities were inherited, and endeavored by direct precept and law, as well as by indirect advice and admonition, to preserve and improve the qualities of the Jewish people. Many "eugenic" rules were incorporated in the biblical and rabbinical laws. Two of the main ideals were early marriage and children. "Among the seven types not acceptable before God are included both the unmarried man and the married man without children." The Rabbis advised "that an extremely tall man should not marry an extremely tall woman, lest the children be awkwardly tall; nor should one of short stature marry a woman of the same size, lest their offspring be dwarfed. For the same reason, the intermarriage between blonds or between dark-complexioned people was not countenanced. A number of precautions in sexual relations were prescribed in order to prevent the birth of defectives, such as lepers, epileptics, the deaf and the dumb, the lame and the blind.

"Raba advised every young man not to marry a girl before he knew all about her immediate family, especially about her brothers, for 'children usually inherit the traits of their mother's brothers.'

"The attempt to limit the multiplication of the undesirable elements in the Jewish race resulted in three kinds of prohibitions. First, prohibition against the marriage of defectives by reason of heredity; secondly, the prohibition against the marriage of personal defectives; thirdly, the prohibition against consanguineous marriages.

"Besides the prohibition against defective marriages mentioned in the Mosaic code, the Talmud forbade one to marry into a confirmed leprous or epileptic family, or to marry a woman who had buried three husbands."

The distinctive features, however, of Jewish eugenics lay "in the greater emphasis laid on the psychical well-being of posterity."

THE INCREASE OF IGNORANCE. Editorial, *J. Hered.*, Wash., April, 1917, 178-183.

Deals with certain vital statistics of the different wards of Pittsburgh, which show a high birthrate and also lower infant mortality in the wards of the poor and foreign born than in those of the native best educated and prosperous people. The precise biological value of such conditions, very difficult to gauge, is not elucidated by the otherwise interesting contribution.

THE YOUNG MOTHER. Editorial, *J. Hered.*, Wash., Sept., 1917, 394-6.

Editorial comment on the subject based on certain investigations by Alexander Graham Bell and Publications on the subject by other authors.

Age of mother in general has a marked effect on the vitality of her children, infant mortality increasing steadily as the mother grows older.

"As measured by infant mortality the best age for a girl to marry is probably between 20 and 25; and every year a woman delays child-bearing after the age of 25 is penalizing her children."

LARGE FAMILIES. Editorial, *J. Hered.*, Wash., July, 1917, 299-302.

In the main an extended comment on investigations in this direction by Alexander Graham Bell. The notion that large families are an evil is false and dangerous. With normal healthy parentage families of 9 to 10 children show fewer early deaths and larger percentage of longevity than others. Under same conditions family of from 6 to 8 children appears most favorable to longevity of mother. Data drawn from slums are misleading. "Large families in superior stock will produce superior children; large families in the slums are likely to produce inferior children."

STANFORD'S MARRIAGE RATE. Editorial, *J. Hered.*, Wash., April, 1917, 170-173.

Three-fourths of men graduates marry, but only half of women. Possible reasons for the difference, which may be on the increase, are suggested. Some comparisons are made with other Institutions.

FEW WOMEN MEDICAL COLLEGE GRADUATES MARRY. *J. Hered.*, Wash., Oct., 1917, 463.

Editorial comment on 60 female medical graduates of the Johns Hopkins University. The marriage rate of these women approximates only 37 per cent, which is lower than that of any general woman's college, though perhaps not lower than that of college women who take the degree of Ph.D. The suggestive causes are an inclination toward a career rather than matrimony, and possibly prejudice in men toward women "who know too much."

THE CELIBACY OF TEACHERS. Editorial, *J. Hered.*, Wash., June, 1917, 259-260.

There are in the United States over a half million of women engaged in teaching, who under the rules must live in enforced celibacy. The withdrawal of this large body of women from the career of motherhood so long as they wish to remain teachers, would only be justified if these women were below the average of the rest of the female population in eugenic qualities. As this is far from the case their celibacy "must be considered highly detrimental to racial welfare."

MARRIAGE RATE OF NURSES. Editorial comment, *J. Hered.*, Wash., Nov., 1917, 510-11.

Alumnæ records of four of the larger training schools for female nurses show an unexpectedly low rate of marriage, ranging from 34 per cent to 52 per cent (mean 42 per cent). As physically and probably also mentally the trained nurse represents a class that stands distinctly above the average of the population, and as there are now in the United States nearly 200,000 female nurses, the low marriage rate is unquestionably disadvantageous. Its causes are not plain, and are probably of complex psychological as well as economical nature.

THE BIRTH RATE OF METHODIST CLERGYMEN. Editorial, *J. Hered.*, Wash., Oct., 1917, 455-59.

Prominent churchmen were found to have nearly all married, and to have more children than other men of similar education and social rank, despite their small salaries; nevertheless some evidence of birth control existed.

A NOTE ON EUGENICS. By Landau (Dr.)—*Revue Anthropologique*, July-Aug., 1916; repr. in *Eugenics Rev.*, Lond., April, 1917, IX, 50-52.

An improvement in the modern family is a pressing need. "The problem of the family should be considered from a biological point of view, simply because it is a question of biology, though greatly influenced by social problems. Modern life with all its many temptations has distorted the normal conception of man's happiness. . . . The whole education of the young of both sexes should have a wider, a more moral and a healthier outlook."

THE EUGENIC ASPECTS OF NATIONAL BABY WEEK. By March (Norah)—*Eugenics Rev.*, Lond., July, 1917, IX, 95-108.

"The majority of the nation's children are well-born, and, given a fair nurtural opportunity, they would ensure a strong race. To forward this has the National Baby Week Campaign been inaugurated."

The objects of the movement are a better safeguard of the child's life and assistance based on scientifically established principles of its physical and mental development.

SAVE THE CHILDREN. *Eugenics Rev.*, Lond., July, 1917, IX, 109-116.
Report on the physical welfare of mothers and children in England and Wales.

Relates to the Baby Week noted above and "dedicated to the conservation of the physical welfare of the mothers and children" of England. Gives some statistics on mortality of infants, that of women during pregnancy, childbirth, and puerperium, and notes means for improvement in these directions.

THE EUGENICS OF "BABY WEEK." By Schiller (F. C. S.), C. D. Whetham, J. Arthur Thomson and Dr. Rentoul. Correspondence, *Eugenics Rev.*, Lond., Oct., 1917, IX, 233-36.

Valuable criticisms and suggestions relating to above two articles.

THE PARENTS OF GREAT MEN. *J. Hered.*, Wash., Sept., 1917, 400-408.

Extended editorial comment and criticism on C. L. Redfield's hypothesis that the breed is improved by late procreation and strenuous exercise of higher faculties by parents during their life anterior to the conception of the child. It is pointed out that in the human species at least there are many exceptions to such a theory.

CONTRIBUTO ALLO STUDIO DEI RAPPORTI TRA L'INTELLIGENZA E I FATTORI BIOLOGICO-SOCIALI. By Saffiotti (F. Umberto)—*Rivista di Antropologia*, Roma, 1913, XVIII, fasc. 1, 2; rev. in *Eugenics Rev.*, Lond., Jan., 1917, 365-373; also *J. Hered.*, Wash., June, 1917, 261-267.

There are considerable differences in the intelligence of children because of differences in inheritance, in training and education, and in social and economic status of the parents.

CONSTRUCTIVE ASPECT OF BIRTH CONTROL. By Sprague (Robert J.), *J. Hered.*, Wash., Feb., 1917, 58-62.

"Birth control must not stand by itself and be preached and judged as an unrelated thing; it is only one important factor in the great program of the nation's problem of population and race vitality."

"If in America we are to develop a national unity, a great American art and literature, a full realization of American genius for all classes and races already with us, and a respectable position of influence in the world's progress and affairs, we must have a birth rate among all classes sufficient to maintain, increase, and unify the people of the United States into one great social and national body."

SIGNIFICANT EVIDENCE FOR MENTAL HEREDITY. By Woods (Frederick Adams)—*J. Hered.*, Wash., March, 1917, 106-112.

Relates mainly to problems of human heredity. Much supposed proof of mental inheritance is, in the view of the author, unsatisfactory. The problem is in a large measure distinct from that of ordinary heredity in plants and animals. Evidence is adduced from twins, royal families, and eminent men. Mainly generalizations.

MAN'S VARIATION: OSTEOLOGY

DÉMONSTRATION DE L'EXISTENCE DE LA FOSSETTE GÉNIIENNE DE LA MANDIBULE CHEZ LE JEUNE ENFANT DE LA PIERRE POLIE. By Baudoin Marcel)—*Compt. rend. Acad. Sc's.*, Paris, 30 Oct., 1916, 491-2.

Note on four lower jaws of young infants (2 to 3 years), found in a neolithic ossuary at Cous (Vendée), and showing a complete absence of the genial or mental spines, their place being occupied by a more or less marked depression of the anthropoid type.

ANOMALIE DE LA PREMIÈRE CÔTE GAUCHE. By Clerc (A.), R. Didier & J. Bobrie—*Bull. Acad. Med.*, 1917, No. 13, 421-22.

Anomalous first rib extracted from a living subject by a surgical operation. The operation was necessitated by pains, etc., due to pressure by the bone on the superior brachial plexus. The rib was straight, abnormally slender and with the anterior free pointed extremity attached to the second rib by fibrous tracts with little muscular tissue.

THE INTERNAL STRUCTURE OF THE SPHENOIDAL SINUS. By Cope (V. Z.)—*Proc. Anat. Soc. Gr. Brit. & Ire.*, June, 1916, 7. In *J. Anat.*, Lond., 1917, LI.

A brief note. The sinus is not a simple cavity, but presents more or less constant septa and loculi.

THE ENGLISH CLAVICLE. By Parsons (F. G.)—*Proc. Anat. Soc. Gr. Brit. & Ire.*, June, 1916, 6-7.

Brief notes on measurement of nearly 300 modern English clavicles of known sex and age. Only few results mentioned; the left bone exceeded the right in length in both sexes; correct sexing of bones found possible in 88 per cent of cases; attention drawn to the foramen which may perforate the bone, and specimens of such nature exhibited by E. Barclay Smith, showing the descending cervical nerves in situ in the canal.

BIACROMIAL BREADTH. ON THE PROPORTIONS AND CHARACTERISTICS OF THE MODERN ENGLISH CLAVICLE. By Parsons (F. G.)—*J. Anat.*, Lond., 1916, LI, 71-93.

This, though published six months previously to the above, is the detailed report on same studies.

As to the biacromial breadth, the author at first took it as recommended in the anthropological textbooks, but "after using it for some time on both the living and dead subject, came to the conclusion that it is a thoroughly unpractical and unreliable measurement except in the thinnest bodies." He found competent observers differing by two, three, or more centimeters in this measurement, and obtained as great differences himself in remeasuring the same body after a short interval; in fact, he was so disappointed that he left off taking it and contented himself with measuring the shoulder width at the upper part of the deltoid.

The report on the clavicle itself gives the results of careful examination and measurements of clavicles of 103 males, 80 females, adults of known ages, from lower classes. Average length of left clavicle found slightly greater than that of right in both sexes. Deduction of shoulder width from that of the clavicle more or less uncertain, but fair approximation frequently possible. The difference between the right and left clavicle of same person may be as much as 9 mm. The curvatures are somewhat more pronounced in the males than in the females, while in both sexes the right bone is a little more curved than the left. No perceptible influences of the curvature was found in age.

The average length of the male English clavicle is close to 15.2 cm., that of the female 13.8 cm. The report ends with notes on the nutrient foramina, perforations of the supraclavicular nerve, depressions for the first rib, the conoid facet, and the trapezoid tubercle; and there are 8 pages of detailed measurements. A valuable contribution.

CERTAIN FEATURES OF THE HUMAN PISIFORM. By Robbins (R. H.)—*Proc. Anat. Soc. Gr. Brit. & Ire.*, June, 1916, 10. In *J. Anat.*, Lond., 1917, LI.

Brief notes on some of the characteristics of the bone.

ANTHROPOLOGISCHE UNTERSUCHUNGEN AN DER SCHÄDELBASIS. By Schultz (Adolf H.)—*Archiv f. Anthropologie*, 1917, N. F. Bd. XVI, 1-103.

Investigations on over two hundred skulls of Australians, Negroes (Congo), ancient Egyptians, Chinese, Eskimos (Greenland) and Europeans (Swiss) and on those of a series of infants and of monkeys, led to the following chief results:

The diameters of the base of the skull are more variable than the greatest length and the greatest breadth of the skull. The length-breadth index of the base is more variable than the cephalic index. The former is correlated to the latter, but a decrease in the cephalic index is not followed by a change to the same amount in the index of the base. Extremes in cranial capacity, within limits, have no influence on the size of the base. In females the base is absolutely and relatively smaller than in the male. In particular, the transverse diameter of the base is smaller in women. Among the races, the Australians and ancient Egyptians have relatively the smallest, the Eskimos relatively the largest base. The distance between the nasion and the hormonion (where the posterior border of the vomer touches the sphenoid), *i.e.*, the base-length of the facial part of the skull, remains in close correlation to the basi-nasal length (average correlation coefficient + 0.843), but is little influenced by the length of the hard palate. The position of certain points, especially those situated outside of the median sagittal plane, cannot be determined by direct measurements, and a new method of projective measurements corresponding to the principles of analytical geometry was worked out. The positions of the foramen magnum and of the external auditory meatus (porion) are in horizontal direction

comparatively constant, in vertical direction very variable. In all races the meatus is situated lower and more forward in women. In Europeans the meatus is situated horizontally as well as vertically very much closer to the basion. In projection, on the glabella-basion horizon, the meatus lies without exception in front of the basion, and this seems to be the case in all mammals. In relation to the basion the condyles lie farther back in women. The fossa mandibularis is most deeply situated in Europeans and Eskimo, and these races also show the strongest developed tuberculum articulare. The highest choanae were found in Chinese and Europeans. The position of a number of other points of morphological interest were studied and showed racial differences.—A. H. SCH.

ON GROWTH AND FORM. By Thompson (D'Arcy Wentworth)—8vo, Cambridge, 1917, I-XV, 1-793.

A treatise embodying much erudition, on the physics and mathematics of biology, including man. According to the author the work is "all preface," for which reason also it ends "with no formal and elaborate conclusion." He endeavors to show "the naturalist how a few mathematical concepts and dynamical principles may help and guide him . . . and to show the mathematician a field for his labors."

A section of particular interest to anthropology is that on p. 772, relating to comparisons of the human with anthropoid crania. In the opinion of the author "an inherent weakness underlies the anthropologist's method of comparing skulls by reference to a small number of axes. The most important of these are the 'facial' and 'basiscranial' axes, which include between them the 'facial angle.' But it is, in the first place, evident that these axes are merely the principal axes of a system of co-ordinates, and that their restricted and isolated use neglects all that can be learned from the filling in of the rest of the co-ordinate network. And, in the second place, the "facial axis," for instance, as ordinarily used in the anthropological comparison of one human skull with another, or of the human skull with the gorilla's, is in all cases treated as a straight line; but our investigation has shown that rectilinear axes only meet the case in the simplest and most closely related transformations; and that, for instance, in the anthropoid skull no rectilinear axis is homologous with a rectilinear axis in a man's skull, but what is a straight line in the one has become a certain definite curve in the other."

The work points to apparently fascinating fields for future scientific exploration and cultivation. It suggests, however, a danger, so far at least as anthropology is concerned, which is that attempts may be made to enter these fields at the expense of the substantial and laborious preparation called for in this branch of learning.

CORRELATION IN METOPIC SKULLS. By Young (Matthew)—*Proc. Anat. Soc. Gr. Brit. & Ire.*, June, 1916, 10-11. In *J. Anat.*, Lond., 1917, LI.

Brief report of research on nearly 80 West Scottish metopic skulls, preserved in Anatomical Department, University of Glasgow.

Metopic skulls are broader in front but shorter and lower than non-metopic of similar capacity. Metopism represents "probably only one feature in a general change in the growth factors" of the skull. The results of metopism are—"exaggeration of brachycephalic characters in a brachycephalic series, and a nearer approach to the brachycephalic type in a dolichocephalia series." It is probably a progressive phenomenon. In discussion A. Keith points to absence of metopism in anthropoid apes.

VARIATION: BODY, LIMBS, SOFT PARTS

A POLYDACTYLOUS FAMILY. By Atwood (Edith S.) and Clara P. Pond.—*J. Hered.*, Wash., Feb., 1917, 96.

A brief report on a four-year-old boy with a supernumerary thumb on each hand and a supernumerary toe on each foot. Polydactylism in father's family.

ORTHODACTYLY. By Duncan (Frederick N.)—*J. Hered.*, Wash., April, 1917, 174-75.

Report on a family showing heredity stiffness of certain finger joints. Trait has also been called symphalangism. Both males and females show the abnormality.

A BILOBED EAR, AND ITS INHERITANCE. By Schofield (Richard)—*J. Hered.*, Wash., Nov., 1917, 517-18.

"In a family in which a bi-lobed ear has been transmitted through four generations, only the right ear shows the characteristic in question. . . . There is no regularity in its manifestation so far as generations are concerned, and it appears in either sex, and in both sexes in the same family. Its appearance is not constant, for it may skip one or even two generations." There is no information as to when the strange anomaly was first noticed in the family. The separation varies from a mere furrow to a cleft of considerable length, and has not been noticed to change with age.

A WOMAN WITH HORNS. By Wood (Richard H.)—*J. Hered.*, Wash., Oct., 1917, 434

A note, with a photograph of one of the horns. The subject was a female, seventy-eight years old, born in United States of German descent, in a family peculiar as to mentality, some members being up to or above common, others decidedly defective. The "horn" was not attached to the skull but was merely a development of the skin. It was fed by a small branch from the temporal artery and the blood supply was so ample that a profuse hemorrhage followed the operation for its removal. A similar horn was removed from the opposite side of the forehead a year ago. The sites of the two scars correspond very accurately. The "horn" was nearly 3 inches long, over $\frac{3}{4}$ of an inch in maximum thickness near the base, conical in shape, and curving back-

ward in its distal third. It is regrettable that no portrait of the subject accompanies the report.

VARIATION: RACIAL

MENTAL DEVELOPMENT OF THE SOUTH AFRICAN NATIVE. By Bryant (Rev. A. T.)—*Eugenics Rev.*, Lond., April, 1917, IX, 42-49.

Observations based on 33 years intercourse with the Zulu-Kaffir tribes. "The African intellect, as exemplified in its manhood, is simply incapable of reaching the brilliance or of attaining the range of that of the European. Be it a matter of reflecting, or of judging, or comprehending, or conceiving, the African is everywhere hopelessly outdistanced by the European. Only in the province of memory and of imitation can he bear a favorable comparison with him, for in these two respects the African is decidedly strong.

"But when we pass into the domain where intuition reigns, there another story must be told. There the honors fall to the African, and the poorly endowed European must perforce fall to the rear. The African, in company with the lower animals, is still possessed of certain instincts or senses which in us, perhaps by atrophy through disuse, have entirely disappeared.

"The mode and measure of mental growth amongst the male children of the two races is not the same, the difference taking the form of a comparatively precocious development of the mental faculties in the African boy in the earlier years of life (say, up to 12), rapidly succeeded (at some time between the ages of 12 and 20), first, by a gradual arrest of normal growth, then by an actual decline of mind-energy and decrease of mind-power to a point below that already reached in the preceding stage, which is never regained; and in the case of the European boy, a much slower and more gradual development of the intellect, progressing continuously from, say, the sixth year, through the puberal period (at which a slight temporary arrestment may take place), until somewhere after the 18th year, the maximum of mental power, to which the average African never attains, is reached."

Curiously, no similar differences were discerned by the author between the negro and white females, both children and adults. Possibly the observations in this respect were more limited.

THE PSYCHOLOGY OF THE NEGRO. By Ferguson (George Oscar)—*Archives of Psychology*, April, 1916, No. 36 (Columbia University Contrib. to Philos. & Psychol., vol. XXV, No. 1); repr., pp. 1-138.

A valuable contribution to the subject based on mental tests of 486 white and 421 colored school children of Richmond, Fredericksburg, and Newport News, Va. The results indicate that "the average performance of the colored population of this country in such intellectual work as that represented by the tests of higher capacity, appears to be only about three-fourths as efficient as the performance of whites of the same amount of training." But this proportion is not true for the

different classes of negroes. "It is probably correct to say that pure negroes, negroes three-fourths pure, mulattoes and quadroons have, roughly, 60, 70, 80 and 90 per cent, respectively, of white intellectual efficiency. If it were possible to distinguish these four classes of negroes so accurately as to avoid overlapping, it is probable that the differences revealed by tests would be greater rather than less than those indicated by the figures." Numerous indications of collateral nature, such as the proportion of prominent men in the two races, etc., point in the same direction.

The article is supplemented with a good bibliography on the subject, and with detailed exposures of the tests employed.

THE MIRIAMITES. By Clark (Dr. Hubert Lyman)—*The Scientific Monthly*, N. Y., Feb., 1917, IV, 97-109.

General account of the natives of Murray Islands, Torres Straits. Of Melanesian ancestry, they are characterized by "very dark skin, broad nose and woolly hair . . . characters obviously like those of Africans, but the shape of the skull and the thinner lips are evident differences." The illustrations accompanying the article are so reduced as to be of little use; the best one, on p. 101, shows children with plain negroid features.

L'INDICE SCHELICO NEI DUE SESSI (The bust-index in the two sexes). By Giuffrida-Ruggeri (V.)—*Rivista di Antropologia*, Roma, 1916-17, XXI, repr., 1-20.

A valuable discussion of the sex differences in the bust-index, i.e., the percental relation of height-sitting to stature. The data show that in a large majority of racial groups the index is slightly higher in the females, indicating relatively shorter legs; in a few irregularly distributed tribal groups the indices were reported as equal in the two sexes, while in a slightly larger proportion of cases the female index is very slightly inferior to that of the male. The index is high in infancy and childhood, diminishing with age, showing that the growth of the lower limb proceeds with a slightly higher acceleration than that of the bust. A remarkable uniformity is seen in the bust-index in America, and there is a close relation between the indices from America and Northeastern Asia, as well as Europe. In the African negro, on the other hand, the index is generally lower, indicating relatively long limbs. A similarly low value is also present in the Australians.

RACIAL TYPES AT ABU SIMBEL. By Golénicheff (W.) (with notes by editor)—*Ancient Egypt*, London, 1917, part II, p. 57.

Interesting photographs of ten captives from graven figures on the pedestal of one of the colossi near entrance of the great temple at Abu Simbel. The "foreigners" are identified as a North Arabian, an Armenian, a Hittite, a native from the plains of Esdraelon, an Atha, a Kemena, two Palestine Shasus, a Phoenician and a man from near Tyre.

THE RACIAL ELEMENTS CONCERNED IN THE FIRST SIEGE OF TROY. By Peaks (Harold)—*Man*, May, 1917, No. 58, p. 80.

Note in reply to criticism on the author's earlier publication on the subject.

THE PHYSICAL CHARACTERS OF THE ARABS. By Seligman (C. G.)—*J. Anthr. Inst.*, London, 1917, XLVII, 214-37.

Our knowledge of the Arab is very imperfect. The traditional conception of his being "dolichocephalic and leptoprosopic" is only partly true, for many are brachycephalic. Basing his views on the work of previous authors as well as his own observations, the author, who is well known for his excellent work in Sudan, reaches the following conclusions:

"(1) The population of Northern Arabia is predominantly long-headed, that of Southern Arabia round-headed.

"(2) There is reason to believe that Mesopotamian cultural influence was exerted in South Arabia at least as far back as the first half of the first millennium B.C.

"(3) Part at least of the brachycephals of Southern Arabia conform in skull form and facial characters with the Mesopotamian type, and on the evidence of Sabaean coins this was the case 2,000 years ago.

"(4) The occurrence of skulls of Mesopotamian type in an ancient Arab graveyard in Egypt, and in Tripoli, in the midst of predominantly long-headed populations, may be explained by regarding these as immigrants from Southern Arabia (or their descendants), though so far as Tripoli is concerned the influence of "Barbary" pirates cannot be excluded.

"(5) It may be suggested—as a matter for further research—that the brachycephaly of certain populations of the western half of Northern Africa may be due to Arabian influence."

ABNORMAL CLASSES

ANTHROPOMETRY AS AN AID TO MENTAL DIAGNOSIS. By Doll (E. A.), Public. Training School at Vineland, N. J. (Research Dept.), Feb., 1916, No. 8, 1-91.

Largely a corroboration of the old adage of *mens sana in corpore sano*. The mentally defective are in general also below par physically.

THE INDIANA SURVEY. By Estabrook (A. H.)—*J. Hered.*, Wash., April, 1917, 156-159.

Survey of mental defectives. Two counties show 15 of such defectives per 1,000 population—19 in A, 115 in B counties, both peopled very largely by natives of old stock, with few foreign born. In relative frequency the feeble-minded stand first (10.7 per 1,000), insane next (3.1 per 1,000) and then epileptics (1.85 per 1,000).

A SOCIAL STUDY OF MENTAL DEFECTIVES IN NEW CASTLE COUNTY, DEL. By Lundberg (Emma O.)—U. S. Children's Bureau, Public. No. 24, Wash., 1917, 1-37.

Contribution to the subject of frequency, social and racial menace, and care of mental defectives. More than one-half of those in urgent need of special care and protection were found at large in the community.

THE MARRIAGE RATE OF THE INSANE. By Myerson (A.)—*Am. J. Insanity*, Jan., 1917. In *J. Hered.*, Aug., 1917, 378.

Studies based on 663 families. To a greater or lesser extent all types of insanity act adversely on reproduction, but in the female sex the hindrance is less than in males.

ELIMINATING FEEBLE MINDEDNESS. By Punnett (R. C.)—*J. Hered.*, Wash., Oct., 1917, 464-465.

Ten per cent of American population are probably carriers of mental defects of some nature. Cure of these conditions very difficult and some method besides that of elimination must eventually be employed. The efforts must be directed toward improvements in heredity.

FEEBLE-MINDED IN OHIO. By Sessions (Mina A.)—*J. Hered.*, Wash., July, 1917, 291-298.

Survey of one county shows that 1 per cent of population is mentally defective.

In the rural districts the proportion of feeble-mindedness was found twice as great as in the cities; and the mining areas have a larger proportion of feeble-minded than the agricultural districts. One inbred family that came under observation has produced a large number of defectives.

HEREDITY AND JUVENILE DELINQUENCY. By Williams (J. Harold)—*Eugenics Rev.*, Lond., April, 1917, IX, 18-31.

Report on a study of twelve families with one or both parents defective. The results show that "much of our delinquency may be directly accounted for by the perpetuation of degenerate and tainted stock;" and the study of delinquency indicates "that in nature and nurture, not separately, but collectively, must we look for an improved social being."

RACIAL FACTORS OF DELINQUENCY. By Williams (Tom A.)—Proc. II. Pan-Amer. Sc. Congr.; Wash., 1917, I, 417-431; Abstr. also in Proc. XIX Int. Congr. Amer. Wash., 1917, 602.

"It would be premature to attempt an ultimate comparison of racial factors in delinquency for two reasons; Firstly, adequate analyzed statistics of delinquency itself are not yet available, because of the recency of establishment of juvenile courts and the disparity of their methods and those of the police departments which subserve them. In the second place, time for a conclusion is not ripe because the elements

themselves of delinquency are not yet standardized and related to norms, without which the analysis is fallacious.

"This presentation, then, merely attempts, and that far from completely, to state some of the fundamentals with regard to which it is necessary that the problem of delinquency in relation to race must be envisaged."

Statistics regarding the racial incidents of delinquency are unreliable; nevertheless a much larger percentage of the children of immigrants than native Americans are arrested as criminals, and the rate among the negroes is four times as great as that among the white native Americans. In these connections we must allow, however, for many economic and other features of causation of delinquency, and until these are allowed for it is not possible to estimate the racial factors of delinquency.

ANTHROPOLOGICAL PROBLEMS PECULIAR TO THE UNITED STATES

MODERN POPULATION OF AMERICA. By Boas (F.)—Proc. II Pan-Amer. Congr., Wash., 1917, I, 9-15.

"The scientific problems involved in this subject are of great and fundamental importance, but unfortunately materials for their discussion have hardly been collected at all," and there is no immediate prospect of their being gathered on an adequate scale.

Three distinct types of population may be distinguished in modern America: (1) Descendants of European immigrants; (2) Populations containing a large amount of Indian blood; and (3) Populations with a large amount of Negro blood. There is no positive evidence that the mixed races are physically or mentally inferior; and an unfavorable effect of mixture of races is very unlikely. The question of new types of population arising from the various mixtures can hardly be answered as yet with any degree of definiteness. The hereditary processes observable in these mixtures are, it seems, much more likely various types of alternating inheritance than true Mendelian forms. The types that come to America do not remain stable, but the amount of change is not yet definitely determined. Efforts toward improving the physical type of the population demand careful consideration.

URBAN STERILIZATION. Editorial, *J. Hered.*, Wash., June, 1917, 268-269.

Points to effect of city life in cutting down increase of a superior population, as shown by new figures—native-born American stock fails to hold its own in most parts of the United States. Based mainly on Gillette (John M.) *Constructive Rural Sociology* (2d ed.), N. Y., 1916, 1-89; and the same author's *A Study in Social Dynamics*. Quarterly publication *Am. Statistical Assoc.*, 1916, XV, 345-380.

THE "MELTING POT" A MYTH. Editorial, *J. Hered.*, Wash., March, 1917, 99-105.

Editorial note on researches by A. Hrdlička concerning physical and physiological characteristics of representatives of old American families.

There is as yet no unity of type, the diverse ancestral type persisting with considerable clearness. Yet an approach to the formation of a separate American sub-type of the white race is noticeable in physiognomy, pigmentation, stature, and certain features of the face and body.

THE OLD WHITE AMERICANS. By Hrdlička (Aleš)—Proc. XIX Intern. Congr. Amer., Washington, 1917, 582-601.

First report on author's studies of descendants of old American families. The results, as far as determined, are summarized as follows: The investigations show plainly "that no definite, already formed, strictly American type or sub-type of the whites as yet exists; and as intermarriages of the Old Americans with more recent elements in this country are rapidly becoming more numerous there seems no chance for the formation of something like a separate American type of population, at least within many centuries.

"The examinations have shown in many instances a remarkable persistence of heredity characters and their strong individuality, as we may express it, with slow, irregular, unwilling yielding to a complete and permanent fusion with other characters of the same class.

"Yet there are indications that some progress has been made toward such a fusion, and that if the Old American families could be kept in full vitality and free from intermixture with newer elements for several more centuries, there would eventually come into existence in this country a real separate sub-type of white people, which would possess numerous if not great distinctive characteristics from the European whites and would be strictly American."

THE EYE AND HAIR COLOR IN CHILDREN OF THE OLD AMERICANS. By Stevenson (Beatrice L.)—Proc. XIX Int. Congr. Amer., Wash., 1917, 603-605.

Report on eye and hair color in 100 children and adolescents of Old American families in New York City. The results show: *Hair*—(1) No very blond and no black hair; (2) a predominance of brown shades; and that, (3) the hair grows darker with age. *Eyes*—(1) Brown eyes outnumber blues; (2) but taking all blues, greens and greys together, the proportion becomes about equal with the browns.

THE AMERICAN INDIAN

ANALYTICAL AND CRITICAL BIBLIOGRAPHY OF THE TRIBES OF TIERRA DEL FUEGO AND ADJACENT TERRITORY. By Cooper (John M.)—Bull. 63, Bureau American Ethnology, Wash., 1917, 1-233.

Without question one of the best contributions of this nature. The author has endeavored, with much success, to "gather, analyze, and evaluate the extant written sources" for Fuegian and Chonoan anthropology; to "draw up lists of references covering the various phases of anthropology" of these people; and to "sift the available material for all evidence that might help toward clearing up obscure or debated points."

The work comprises three parts: (1) The Introduction; (2) The Bibliography of Authors; and (3) The Bibliography of Subjects. The Introduction treats of the names, divisions, territories, and present conditions of the Fuegian and Chonoan Indians, and gives a short history of investigation on these tribes, with a summary of what has been accomplished and what still remains to be done. The surprisingly large Author Bibliography gives an analysis and critical appreciation of each book and article, briefly or more at length in proportion to the importance of the work from the standpoint of the anthropologist.

From the standpoint of physical anthropology, the evidence shows that "the same physical type is found over the whole area under consideration, from Dawson Island and Brecknock Peninsula to the vicinity of the Gulf of Penas." This type, essentially Indian, is characterized by moderate stature, with meso- to dolichocephaly.

The volume will be an indispensable aid to all students of the southernmost tribes of this continent. If it leaves anything to desire it is that it might have been possible to include, in the parts touching on somatology, brief abstracts of the various measurements and observations.

THE GENESIS OF THE AMERICAN INDIAN. By Hrdlička (Aleš)—Proc. XIX Intern. Congr. Amer., Wash., 1917, 559-568.

Résumé of author's conclusions on the subject. Illustrated with nine plates of racial portraits from eastern Asia and Malaysia, showing Indian type.

TRIBES OF THE PACIFIC COAST OF NORTH AMERICA. By Kroeber (A. L.)—Proc. II Pan-Amer. Sc. Congr., Wash., 1917, I, 22-37.

This is essentially an ethnological article, but under section "Race" the author touches on the somatological part of the problem. While they all belong to the general Indian type, the tribes of the Pacific coast show considerable differences in individual characteristics, such as stature, head form, etc. It is doubtful if these tribes show any greater resemblance to the Mongolian people of Asia than do other American units.

VITAL STATISTICS OF THE INDIANS OF EASTERN BOLIVIA. A review of Baron Erland Nordenskiöld's paper on "Die Bevölkerungsbewegung unter den Indianern in Bolivien" (*Petermanns Mitt.*, April, 1917) in the *Geog. Rev.*, N. Y., Dec., 1917, 487-88.

The figures for birthrate are excessively high and perhaps not quite accurate; if "the average woman in the tribe bore 8 children," then the annual birthrate could hardly be "83 per 1000." Perhaps, however, the author means the total birthrate per woman. The tribes show also a high infant mortality.

A NOTE ON THE GUARANI INVASIONS OF THE INCA EMPIRE. By Means (Philip Ainsworth)—*Geog. Rev.*, N. Y., Dec., 1917, 482-84.

Historical data.

THE YURACARÉ INDIANS OF EASTERN BOLIVIA. By Miller (Leo E.)—*Geog. Rev.*, N. Y., Dec., 1917, 450-64, with 6 illus.

A well written general report on the Yuracaré and several related groups of Indians. The Yuracaré are a people of the hot, humid lowlands, of the River Mamoré. They are a tall, well-built people, of decided brown color, though perhaps averaging lighter than the Quesha. Figures 2 and 3 show groups of men, women and children, the majority with typical Indian physiognomy.

PRE-COLUMBIAN OPERATIVE DENTISTRY OF THE INDIANS OF MIDDLE AND SOUTH AMERICA. Van Rippen (B.)—*Dental Cosmos*, Sept., 1917, repr. pp. 1-15, 17 figs.

Relates to cosmetic (inlaying) and ceremonial (filing) practices. [Real *i.e.* curative dentistry, has never been observed in pre-Columbian American crania.] The article includes notes on dentistry among the old Egyptians, Chinese, Greeks, Romans and Etruscans. Bibliography.

REPORT ON SKELETAL REMAINS, IN MILLS, WM. C., EXPLORATIONS OF THE WESTENHAVER MOUND. By Todd (T. Wingate)—*Ohio Archaeol. & Hist. Quart.*, Columbus, O., April, 1917, XXVI, 238-56.

Exhaustive report on bones of two skeletons from the mound, which "have suffered considerable post-mortem deformation and are almost entirely mineralized." No question of any great antiquity is involved.

ISHI, THE LAST YAHÍ INDIAN. By Waterman (T. T.)—*The Southern Workman*, Hampton, Va., Oct., 1917, 528-37.

General but highly interesting notes on the last survivor of the tribe.

II. WAR ANTHROPOLOGY

WAR AND POPULATION. Editorial, *J. Trop. Med. & Hyg.*, Lond., 1917, XX, 238-239.

"At the present moment the male population of Europe is being decimated, and a great deal of anxiety as to the probable consequences is to the fore. The Germans with their usual matter-of-fact, not to say animal-like candor, have been openly discussing the fact, and suggestions as to polygamy and the 'official pregnancy' of unmarried women have been the subject of gossip throughout the world. In Britain the scarcity of men and the prospect of this becoming greater has shown itself in the scramble for husbands, amongst the officers and men on leave, by a section of the young women. Hasty weddings are the rule. But it is observable that 'few of the hastily made brides of the past three years have children.' This is frequently the result of voluntary limitation, a 'no family' or 'one child' agreement, frequently bargained for before the marriage, and that most frequently by the woman. The limitation to 'one child' has long been practiced, as shown by the lists of deaths at the front of only sons. One of nature's

inexorable punishments for this practice is the complete bereavement of many of these selfish mothers. Under ordinary conditions, and without wilful limitations, a few years of war would 'not cause national deterioration, but only a temporary lessening of the birth rate; it is only war prolonged for a generation that engenders deterioration. . . . The present war, in spite of its intensity, if it lasts no longer than, say, five years, will not lead to the degeneracy that prevailed through Europe in the eighteenth century, for it does not deeply affect the generation, but only removes a portion of the available adults, and only temporarily lowers the numbers of the population without sapping the manpower of the race."

Quite opposed set of vital problems to which the war has forcibly called attention are those of overpopulation of certain countries or large regions and Nature's remedies for these serious conditions.

AMERICA'S FIGHTING STOCKS. *J. Hered.*, Wash., Oct., 1917, 435-441.

Extended editorial comment on the racial composition of the United States forces. Prevailing type entering into the Army is Nordic, but other strains and races considerably concerned are the Alpine, Mediterranean, Jew, Indian and Negro. The article presents the editor's opinions and claims, not the definiteness of a piece of research.

THE DISABLED SAILOR AND SOLDIER AND THE FUTURE OF OUR RACE. By Darwin (Leonard)—*Eugenics Rev.*, Lond., April, 1917, IX, 1-18.

The fighting men represent on the whole, and that both physically as well as mentally, a selected superior class. After the war, they "should be compensated so as to place them, if possible, in as good a position for marriage and home life as if they have not fought." Every encouragement should be given for marriage and raising of large healthy families. Pensions for disabled should be fixed so as to carry less for the soldier, and more for each child of his subsequent marriage, but different provisions needed for those of potentially unsound heredity. For those not wholly disabled assistance to find work and training for new employment, important. "In assisting the disabled combatant to form a home, we shall, as a rule, be assisting men naturally endowed with some superiority in inborn qualities; and the better the qualities of the man we are trying to help, the more effective will be our efforts."

WAR AND EUGENICS. Birth control and eugenics. By Ellis Havelock)—*Eugenics Rev.*, Lond., April 1917, IX, 32-41.

"The two fundamental eugenic aims—more urgent to-day than they have ever been before—are to impede the production of bad stocks and to favour the production of good stocks."

This may be promoted (I) "By increasing and promoting the knowledge of the laws of heredity . . . (II) By popularising a knowledge of the methods of birth control . . . and, (III) By acting in accordance with our knowledge . . . The present crisis in the history of the race is a challenge to our best endeavours."

EUGENICS IN THE ARMY. *Eugenics Rev.*, Lond., Oct. 1917, IX, 271.

"It will be remembered that in the Galton Anniversary Discussion this year on 'Disabled Sailors and Soldiers and the Future of Our Race,' Dr. Murray Leslie urged the advisability of introducing a clause in the medical reports on invalid soldiers, dealing with the question as to whether the disability of the applicant was constitutional or hereditary and not caused or aggravated by war service

"We note that such a clause is inserted in the new forms, and it will readily be seen that in view of the enormous number of disabilities dealt with, this is a very important step from the eugenic standpoint."

DISABLED SOLDIERS AND MARRIAGE. By R. A. F.—*Eugenics Rev.*, Lond., April 1917, IX, 55.

A brief report on the prospects of marriage of blinded soldiers. Of 296 inmates of the Blinded Soldiers' and Sailors' Hostel at St. Dunstons', London, "55, or 18 per cent, have married since their disablement. It is noted that the wives are to be considered in every case as extremely suitable, and almost without exception as unusually good looking."

THE EUGENIC PRINCIPLE IN SOCIAL RECONSTRUCTION. By Gotto (Sybil)—*Eugenics Rev.*, Lond., Oct. 1917, IX, 183-205.

The article discusses important problems connected with racial reconstruction in England after the War. It dwells particularly on matrimonial, housing, and hygienic regulations.

PSYCHOLOGY AND THE WAR. By Hall (G. Stanley)—*J. Hered.*, Wash., Oct. 1917, 442-47.

The article deals mainly with the effects of the war on the development and applications of psychology and related branches of science in this country. The author further dwells on the mental and other changes that will result from the formation and activities of the Army; on the abnormal mental states resulting from conditions in the trenches, as a result of charges, etc.; and considers other results of the war. In view of all this "should we not in this country . . . foster as something especially germane to the spirit of our institutions the study of individualities and racial and all the other very diversified groups which constitute our heterogeneous population, and do so not only for the development of anthropological science, but with the ideal of fitting each one's aptitudes of body, health, native gifts, traits of character, experiences and motor patterns, to just that occupation that best fits his own psychophysiologic organism, striving to guide each to that environment, industrial, social or cultural, in which his personality will find most incitement to unfold freely?"

RACE HYGIENE IN GERMANY. By V. Hoffman (G.)—*J. Hered.*, Wash., March 1917, 112.

A brief note referring to present ideas in Germany concerning the physical status and eugenics of the population.

MANKIND—RACIAL VALUES AND RACIAL PROSPECTS. By Humphrey (Seth K.)—N. Y., 1917, 1-223. Review in *J. Hered.*, Wash., Nov. 1917, 493-499.

The writer, a Boston business man and author, speculates upon the eugenic and racial effects of the war. Regrettably there are considerable imperfections in his premises as a result of which the conclusions are not always as free from bias as might be desired. To judge of "racial values" is a most difficult task, and to predict the future of nations on the basis of such judgments is a risky procedure. The author holds to the notion of superior and inferior "races" among whites, with all this implies. The book may be said to present the writer's feelings on the subject rather than results of investigation.

EUGENICS AND MILITARY EXEMPTIONS. By Johnson (Roswell H.)—*J. Hered.*, Wash., Aug. 1917, 360.

"With conscription within the narrow range of twenty-one to thirty, and not all men of this age used, it is indefensible to take men of extraordinary ability in any direction not utilizable in the Army, when the work can be done by men whose loss would be less felt by the nation."

SELECT ARMY AVIATORS BY TEST, NOT BY EDUCATION. By Johnson (Roswell H.)—*J. Hered.*, Wash., Sept. 1917, 425.

Note pointing to the higher requirements of the service, the necessity of careful selection, and advisability of special examination and tests.

SOME OF THE EVOLUTIONARY CONSEQUENCES OF WAR. By Macfie (Ronald Campbell)—*Science Progress*, London, July 1917, 132-37.

Though war has been in the world since the time of first organisms, and though its evolutionary importance has been well appreciated by biologists, "yet the sociological and biological significance of human warfare with reference to the evolution of man's body and mind has never been quite adequately studied."

"What physical and spiritual types of man does war select, and what types does it eliminate?"

Statements that war caused degeneracy in the Romans and the French have never been proved and are probably erroneous. In more recent wars "the selective agent has been bacteria rather than bullets, and we have no reason to think that the tall succumb more readily to disease than the very short."

"In any case, it would be extremely difficult to make any permanent alteration in the average stature of any nation of pure or well-mixed race by any process of lethal selection. Variations of stature in the members of any race are, as we now know, mainly matter of nurture—a matter of mother's milk, oatmeal, fresh air, and so on—and a tall man's progeny and a short man's progeny tend respectively to go up and down to the average height of the race; or, as the biometricians put it, to revert to the mean. . . . Any statistics that might happen to show diminution in height of a nation after war must be interpreted

with caution, since in many cases the diminution may be due to the poverty and underfeeding that so often follow war." The eugenics and dysgenics of war should be discussed only with the greatest care, and sweeping statements with regard to the selective consequences of war in general cannot be made. "In every war there is a complicated interplay of conflicting factors; and in each war the factors vary in weight and in direction, so that each war, and almost each battle, will have its own special consequences. A war waged under modern conditions, with machine-guns, and poison-gas, and serums, must be very different in eugenic character and consequences from a war waged with assegais and arrows. A war, again, involving a whole nation must differ greatly in its evolutionary results—social and biological—from a war fought by a few mercenary troops."

The selection of recruits in the nations actually at war does not mean that all the *fit* men have been taken and the *unfit* left behind. The great majority rejected are rejected on account of defects and diseases that were acquired and that will have no or little effect on the racial value of the progeny. Taking all into consideration the author who himself has examined some thousands of recruits doubts whether "the average enlisted man has as much as 3 per cent racial value as the average unenlisted person."

On the other hand the Army is not composed of "the flower of the land," only, it contains men of all sorts of physique and of size.

Does the modern war select the best or worst from the armies? It seems very probable that death under modern conditions of warfare is quite indiscriminate, taking equal proportions from all classes of men. The best regiments are often given the most dangerous tasks, but whether this selection would be sufficiently potent to have much effect on the race as a whole must be doubted.

On the favorable or eugenic side of the war may be counted the good and sufficient food of the soldier, the open air life and physical training.

"It is obviously very difficult to estimate the net result of such conflicting factors as we have mentioned; but, altogether, and giving due and full weight to the considerations, that it is only a part of the male population (the part between the ages 19 and 45) who are subject to the direct selection of war; that many of these leave children; that many skilled workmen of war age are shielded in war factories; that all females are unselected by war; that variations in physique, even if selected, are often only nurtural, and that in any case all stocks remain well represented in the survivors—taking everything together, and giving due weight to these special considerations, I think we might be justified in concluding that the present war is unlikely to have any important eugenic or dysgenic effects on the three nations we have under view. But one very interesting and important eugenic action—an action that has been hitherto strangely overlooked—the war will have. It will lead to a much more stringent selection of women by men."

"It is interesting to note that selection of this nature also makes for the differentiation of nations; for each nation has its own taste in beauty, and this taste, no doubt, has some survival value."

WAR AND THE STATURE OF THE POPULATION. By O'Farrell (H. H.)—*Eugenics Rev.*, Lond., Oct. 1917, IX, 218-22.

Important critique on the oft-repeated statement to the effect that the height of the French population fell off by one or more inches as a result of the Napoleonic wars. The notion originated evidently from inaccuracies in the once popular *History of Europe* by Sir Archibald Alison. The actual data quoted by the author from French originals shows no such conditions.

THE INTERMIXTURE OF RACES IN ASIA MINOR. By Ramsay (Sir William Mitchell)—*Proc. Brit. Acad.*, Lond., 1917, VII, 1-64.

Important contribution to the complex subject by one of its foremost students. The country is peopled by so many remnants of separate tribes and peoples, and these remnants are so mixed that an anthropological map of the country would be impossible. The Osmanli or Turk "have now no racial characters." "The Turk has melted into the old Anatolian stock." Similarly the author saw "no Gauls in Galatia." The Kurds seem to be one of the oldest peoples who can be traced in Asia Minor or Armenia. These and other tribes are regrettably treated of too briefly to satisfy the want of the anthropologist.

It is interesting to speculate what the effects of the war will be on these populations, particularly the Armenians.

MODERN MAN AND HIS FORERUNNERS. By Spurrell (H. G. F.), M.A., M.B., B.Ch. Oxon., F. Z. S.—8°, London, 1917, 192 pp.

This work can perhaps best be referred to as a high-class popular treaty, based on present day knowledge rather than research in anthropology. It is dedicated to "one of the last of that little group of men whose labours during the latter decades of the nineteenth century established the great antiquity of man;" and deals in a general but substantial way with the problems of anthropology; the zoological position of man; extinct species and races of man and their culture; the growth of human power and numbers during the neolithic age; the origins of civilization; the growth and spread of civilization; man at the present day; and the present war. The attitude of the author toward the main problems of mankind, as well as toward those of the actual great struggle, is that of reserve—they are problems before which we stand baffled.

MARRIAGE AND WAR. By Stuart (John)—*Eugenics Rev.*, Lond., April 1917, IX, 53-54.

Interesting comment on the subject as affecting different peoples. "The more or less sacramental ideas about marriage of the early pre-Christian nations seem to have been most highly developed among those who had won their land by the sword and had constantly to defend it."

THE PEOPLES OF HUNGARY: THEIR WORK ON THE LAND. By Wallis (B. C.)—*Geog. Rev.*, N. Y., Dec. 1917, 465-81, with 8 maps in text.

The author in his own words made no attempt "to do more than demonstrate the facts regarding the peoples, nationalities, and farm work of Hungary." The article is not primarily ethnographical, though it devotes short sections to "the distribution of the peoples;" "the distribution of the nationalities;" and "the accuracy of the Hungarian census."

IMMIGRATION AFTER THE WAR. By Ward (Robert De C.)—*J. Hered.*, Wash., April, 1917, 147-152.

Refers in the main to the new law (1917) on immigration. The law will have beneficial effects which will result in an elevation of the mental and physical standards admitted in the future into the country. It would be detrimental "to permit to land on our shores mental and physical defectives, who, themselves and through their descendants, will lower the mental and physical standards of our own people, and will tremendously increase all our future problems of public and private philanthropy."

JAPAN'S MENACING BIRTH-RATE. By Weyl (Walter E.)—*Asia*, Feb. 1918, 129-133.

A noteworthy communication of non-technical character. The population problem in Japan is growing in seriousness not merely to Japan but to the rest of the world.

Everything in Japan turns on this question; "every phase of policy, every hope, ambition, effort, frustration is unconsciously affected."

Japan is badly overpopulated, yet favors the high and increasing birth-rate. It "seems to fit in with all the main trends of thought in the Empire. It suits the militarists, who believe that Japan, to become a world power, must have a population of one hundred millions, in order to exert the outward pressure which will move frontiers and change the face of the world. To have empire, say the imperialists, we must have children; we must have children, say the capitalists, to have cheap labor and successful industries. Let us have children, cry all the Japanese people, in order to maintain our institutions."

At the present rate of growth Japan proper (exclusive of Korea, Saghalien, Formosa and other possessions) will attain a population of one hundred millions in about forty years, and the grave problem is what it will do with these numbers.

CURRENT NOTES

THE XX INTERNATIONAL CONGRESS OF AMERICANISTS

The preliminary announcement of the Congress which according to present arrangements is to be held between the 18th and 30th of June, 1919, has just been received and contains the following particulars:

The session will be held at Rio de Janeiro under the auspices of the Museu Nacional, Instituto Historico e Geographico Brasileiro, Bibliotheca Nacional, Sociedade de Geographia do Rio de Janeiro, Archivo Nazionale, Instituto Historico e Geographico Fluminenseem cooperação com a Academia Nacional de Medicina, Instituto da Ordem dos Advogados Brasileiros, Club de Engenharia, Serviço Geologico do Brasil, Serviço de Protecção aos Indios, Repartição Geral dos Telegraphos, Observatorio Astronomico e Escola Nacional de Bellas Artes.

During the session excursions will be made, both scientific and for recreation; besides which visits will be arranged to museums, historical, geographical and other institutions, which stand in relation to the activities of the Congress.

The usual regulations are made concerning communications and discussion. The membership dues will be \$5.00.

The organizing committee is at present constituted as follows:

President: Dr. Lauro Müller.

First Vice-President: Gal. G. Thaumaturgo de Azevedo.

Second Vice-President: Dr. A. Carlos Simoens da Silva.

Third Vice-President: Dr. Antonio Pacheco Leão.

Secretary-General: Sr. Alfredo Mariano de Oliveira.

Treasurer: Dr. Antonio A. Serpa Pinto.

Assistant Treasurer: Dr. Alfredo Lisbôa.

Secretary: Dr. Luiz Palmier.

First Assistant Secretary: Dr. Francisco Bhering.

Second Assistant Secretary: Dr. A. Morales de los Rios.

Members

Dr. Pedro Augusto Carneiro Lessa.

Conde Paulo de Frontin.

Dr. Miguel Calmon du Pin e Almeida.

Barão de Ramiz Galvão.

Dr. Henrique Morize.

Dr. Euclydes Barroso.

Dr. Gonzaga de Campos.

Dr. Antonio Olyntho dos Santos Pires.

Dr. João Teixeira Soares.

Dr. João Coelho G. Lisboa.

Dr. Escragnolle Doria.

Dr. Jose Americo dos Santos.

Dr. Leopoldo Teixeira Leite.

Dr. Ennes de Souza.

Dr. João Carvalho Mourão.

Dr. Antonio Carlos Ribeiro de Andrada.

Dr. Aurelio Lopes de Souza.

Dr. Julio Benedicto Ottoni.

Dr. José Geraldo de Bezerra Menezes.

Dr. João Coelho Gomes Ribeiro.

The Brazilian Congress will be one of special importance, both for Brazil itself and for American anthropology; and it is most desirable that the United States be largely represented. It should not be forgotten in this connection that in the XIX session of the Congress in Washington there were enrolled not less than 24 Brazilian scientific institutions.

Mr. F. W. Hodge, up to recently the Ethnologist in charge of the Bureau of American Ethnology of the Smithsonian Institution, has accepted a position at the Museum of the American Indian, Heye Foundation, New York City, which will enable him to devote himself in a large measure to field exploration in the Southwest. The selection of the new Chief of the Bureau resulted in the appointment to that position of Dr. J. Walter Fewkes, a member of the Bureau since 1895.

Under the will of Mrs. Evelyn MacCurdy Salisbury, of New Haven, widow of the late Professor Edward E. Salisbury, Yale University is to receive the sum of \$50,000 to found a professorship to be called the *Charles Johnson MacCurdy professorship of Anthropology*, in memory of her father. This bequest is subject to a life annuity. The will also provides for a conditional annual gift of \$1,500 to be expended at the discretion of Professor George Grant MacCurdy for the benefit of the Anthropological Section of the Yale Museum. Another provision is that upon the decease of Professor MacCurdy the sum of \$60,000 is to be paid to either (1) Yale University to create a research fund to be called the Evelyn MacCurdy Salisbury Research Fund in Anthropology, to be used preferably for research work in Prehistoric Archeology, Somatology and Ethnology; or (2) Connecticut College for Women at New London to found a professorship to be called the Charles Johnson MacCurdy professorship of American History (in memory of her father), as George Grant MacCurdy shall designate by his last will, a power of apportionment as between these two institutions being conferred upon him.

A meeting of the *Eastern Association of Graduates of the Angle School of Orthodontia* was held in the Osborn Library of the American Museum of Natural History on Saturday, January 26. President Henry Fairfield Osborn of the American Museum welcomed the association to the Museum and reviewed briefly the work of Cope, Wortman, Osborn, and others on the teeth. A copy of President Osborn's book, "The Evolution of the Mammalian Molar Teeth," was presented to each member of the association. The following papers were presented:

"The Evolution of Orthodonty" by William K. Gregory.

"The Bearing of Physical Anthropology on Orthodontia" by Louis R. Sullivan.

"Pathology of the Alveolar Processes of the Jaw" by A. Hopewell-Smith.

Courses of free public lectures on subjects of hygienic importance will be given during 1918 by several important medical colleges. The program of two such courses, one by the Harvard and the other by the Stanford University Medical School, is given in *Science* of December 28, 1917, page 632. Several of the lectures will be of anthropological interest.

Dr. Arthur Keith, F. R. S., conservator of the Museum of the Royal College of Surgeons, has been appointed Fullerian professor of physiology in the Royal Institution.

Dr. Raymond Pearl, biologist in the Maine Agricultural Experiment Station, and at present at the head of the statistical department of the United States Food Administration, has been appointed head of the department of biometry and vital statistics in the new school of hygiene and public health of the Johns Hopkins University.

A discovery which may eventually prove of some anthropological interest is that of a "growth controlling" substance, named "Tethelin," by T. B. Robertson, Professor of biochemistry at the University of California. For the present the new substance, which is prepared from the pituitary body, is being tested in surgery and promises to be of value in accelerating the healing of wounds or fractured bones which had previously refused to yield to treatment. The discoverer has given his patents to the University for the endowment of medical research.

On November 17, 1917, Professor Franklin P. Mall, one of the foremost authorities in the United States on Anatomy and Embryology, died at Baltimore following two operations for gall stones, in his fifty-sixth year. Doctor Mall held the Chair of Professor of Anatomy at Johns Hopkins University since 1893, in addition to which since 1915 he was the Director of the Department of Embryology of the Carnegie Institution of Washington. He was directly interested in physical anthropology and since 1913 had associated with himself an anthropologist in his embryological investigations.

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PHYSICAL ANTHROPOLOGY: ITS SCOPE AND AIMS; ITS HISTORY AND PRESENT STATUS IN AMERICA¹

ALEŠ HRDLIČKA

B. HISTORY

INTRODUCTION

A historical account dealing with the development of Physical Anthropology in the western hemisphere, must of necessity, for the present, be limited geographically to the northern half of the continent and especially to that part of it under the jurisdiction of the United States, while chronologically it may conveniently stop before the actual era of the science and the work of its living representatives.

No special and comprehensive effort has hitherto been made in this direction, though as early as 1855, in his "Archæology of the United States,"² Samuel F. Haven gave an extended and very creditable account of the general opinions advanced to that time respecting the origin of population in the New World, and of the progress to that date of archeological and anthropological investigations in the United States. In 1898 Dr. George A. Dorsey wrote the "History of the Study of Anthropology at Harvard University,"³ but he used the term "anthropology" in "its broadest, most general sense," and "somatology" received but slight mention; and in 1902 Dr. George G. MacCurdy wrote on the "Teaching of Anthropology in the United States."⁴ There are

¹ Rewritten on the basis of writer's earlier communication on the subject, published in the *American Anthropologist*, (N.S.), xvi, Oct.-Dec. 1914.

² *Smithsonian Contributions to Knowledge*, Phila., 1855, 168.

³ *Denison Quarterly*, Granville, O., 1898, iv, No. 2, 77-97.

⁴ *Science*, 1902, xv, 211-216. A more recent communication on the subject of Professor MacCurdy will be referred to in the final section.

no other publications on the subject, and the task before the writer was thus the more gratifying though also the more difficult one of research rather than of compilation.

The history of physical anthropology on this continent is relatively brief, dating back less than a century, yet preceding the beginnings of the same branch of science in most other countries, and antedating the very use, in its modern sense, of the term anthropology. Also, though largely disconnected and individualistic, that is, represented by workers who arose quite incidentally, sometimes far apart and more or less independently of each other, it nevertheless presents a total record that is highly creditable and should be better known outside of this country.

It is almost wholly a history of anthropologists who were originally or at the same time medical men and especially anatomists or physiologists, and whose field of research was in a very large measure, though not exclusively, American; and it is further distinguished by the fact that its beginnings, as to both time and mode, can be almost exactly determined.

FORERUNNERS OF AMERICAN ANTHROPOLOGY

In a given country the history of any new branch of science would probably show, if it could be traced, a shorter or a longer prodromal period, occupied with the growth of interest in a new direction; then the beginnings of collections or assembling of data; and following that the first efforts at lectures, writing, and association in the new field. Back of this, however, there is, as a rule, a long, unconsciously cumulative epoch, the slow getting ready of the ground. The actual birth of a new science may be counted from the commencement of substantial research work in the new field, which in due time is followed by differentiation of concepts, advanced organization of forces and plans, standardization of procedures, and a gradual development of regular instruction and means of publication. Such was the course of physical anthropology in the United States and the rest of North America.

For the fertilization of the ground in this country nothing could have been more effective than the presence on the American continent of a race whose identity, composition, and origin were problems that from the date of its discovery interested the whole thinking world. To this toward the beginning of the nineteenth century was added the fact that the white man's contact with the Indian in North America was becoming extensive, and the need of knowing the race better physically as well as otherwise, was felt with growing intensity. Good evi-

dence of this feeling can be seen in the excellent instruction given in 1804 by President Jefferson to Lewis and Clark, for their memorable expedition to the sources of the Missouri. Besides other things they were to look into the "moral and physical circumstances which distinguish the Indians encountered from the tribes we know"⁵ and the results of this expedition helped greatly to further stimulate the universal interest in the Indian. An equally marked influence in this direction was due to a growing acquaintance with the multitude of mounds in the Ohio Valley and adjoining regions on one hand, and with the striking Peruvian, Mexican, and Central American Indian remains on the other.

Added to the above factors at home, came potent influences from abroad. Contributions to the natural history, races, and variation of man were published by Linnæus, Buffon, and Cuvier, and especially by Blumenbach⁶ and Prichard.⁷ In 1789 there was organized at Paris, the *Musée d'Histoire naturelle*, which eventually in its scope comprised also man; in 1800 there came into existence in Paris, the Society of Students of Man (*Société des observateurs de l'homme*), which, although short-lived, pointed to a new sphere of investigations of great interest; and before many years had passed the early, physiological, highly stimulating "phrenology" began to call attention to the importance of the study of the brain and skull.

As the first more tangible result of these influences in North America we see the incorporation, in 1812, at Worcester, Mass., of The American Antiquarian Society, with the chief object of "collecting and preserving the material for a study of American history and antiquities."⁸ We learn that, "in the early days of the Society one of the prominent features of its work was the collection of anthropological specimens;" and we find that the first two volumes of the Transactions of this Society are devoted to the American Indian and his remains.⁹

⁵ See *History of the Expedition under the Command of Lewis and Clark*, etc., by Elliott Coues, 4 vols., N. Y. 1893.

⁶ *Decades craniorum*, 1790-1828 (1873); *De generis humani*, etc., 1795 (3d ed.).

⁷ *Researches into the Physical History of Mankind*, 1813 (1st ed.).

⁸ *Transactions American Antiquarian Society*, Worcester, Mass., 1909, 32 pp.

⁹ The first volume, published in 1820, contains Atwater's "Description of the antiquities of the Ohio and other historical states;" Hennepin's "Discovery of the Mississippi;" Johnston's "Indian tribes of Ohio;" and Sheldon's "Account of the Caribs of the Antilles." Vol. II, 1836, contains Gallatin's "Indian tribes of North America," and Daniel Gookin's "Historical Account of the Christian Indians of New England."

The year 1814 marks the beginning in Boston of The Linnean Society, the predecessor of the Boston Society of Natural History (1830-); but there is no evidence that the study of man derived any special stimulus through the activities of this organization. Shortly thereafter, however, a small nucleus for anthropologic research takes form through the labors of Prof. John C. Warren, the eminent anatomist and surgeon and future founder of the present Warren Anatomical Museum of Harvard University. Inspired evidently by Blumenbach's works, Professor Warren began to collect and examine skulls of different races, and in 1822 he published an *Account of the Crania of some of the Aborigines of the United States*,¹⁰ the first publication in this field on the continent. This publication, while of no permanent value scientifically, and while subscribing to the early error that the "mound-builders" were "a different people from the aborigines found here by our ancestors," is nevertheless remarkable for the systematic, technical descriptions of the specimens. In this respect it might well have served as a good example to some later writers on the subject.

A year before the appearance of his paper on American crania, Professor Warren published *A Description of an Egyptian Mummy*,¹¹ and an address by him on American crania, given before the British Association, is quoted in the *Boston Medical and Surgical Journal* (xvii, 1838, 249-253), but evidently his preoccupations were such that he could not give the new field of research sufficient attention. That he did not lose interest in the study of human crania is evident from the fact that in 1837 he engaged no less a student than Henry R. Schoolcraft to collect for him Indian skulls. Owing to various difficulties, however, the gathering of the desired material was interfered with, so that the resulting collection was not very important. The matériel was eventually transferred to the Warren Museum.

In the thirties, collection and study of human skulls received great impetus in this country through the establishment at Boston and Washington of phrenological societies, in which became interested at that time many physicians and other men of science. In 1835 the Boston Phrenological Society published a catalogue of specimens belonging to the Society and derived mainly from the collections "of the late Dr. Spurzheim and J. D. Holm," embracing four hundred and six-

¹⁰ Published as part H of the Appendix to his *Comparative View of the Sensorial and Nervous Systems in Man and Animals*, Boston, 1822, 129-144, pls. v-viii.

¹¹ Pamphlet, 1821; later he gave also "An Account of the Siamese Twin Brothers," *Amer. Med. Jour.*, Med. Sciences, v, 253.

teen entries, among which more than a hundred racial skulls or casts of skulls.

Such was, in very brief, the preparatory period of physical anthropology in this country, and we can now approach the more effective beginnings of this branch of research.

THE BEGINNINGS OF AMERICAN ANTHROPOLOGY—SAMUEL G. MORTON

Physical Anthropology in the United States, speaking strictly, begins with Samuel G. Morton, in Philadelphia, in 1830.

Morton, who was born in Philadelphia, January 26, 1799, received the degree of M.D. at the Medical College of the University of Pennsylvania in 1820 and from the Medical School of the University of Edinburgh three years later.¹² In 1826 he began to practice medicine in Philadelphia and soon after engaged in private instruction in medicine and anatomy. Even before this, however, he became a member of the Academy of Natural Sciences of Philadelphia, took active interest in its collections, which he helped to classify and arrange, and became active in several branches of natural science, particularly paleontology. During these years, as anatomist, he also became interested, through the writings of Lawrence, Virey, Bory de St. Vincent, Gall, and Combe, on the one hand, and through reading the publications of such American authors as Dr. Barton, Professor Caldwell, Dr. J. C. Warren, Professor Gibson, Dr. B. H. Coates, and Dr. M'Culloh,¹³ on the other, in *comparative* human anatomy, in phrenology (which doubtless seemed at that time to open a most promising line of research), and in questions relating to the origin, types and racial affiliations of the American Indians.

According to J. Aitken Meigs, "craniographic" researches were begun by Morton two years after the completion of Blumenbach's *Decades craniorum*. According to Morton himself, however, the beginning of his actual work in anthropology is related to have occurred as follows.¹⁴ "Having had occasion, in the summer of 1830, to deliver an introductory lecture to a course in Anatomy, I chose for my subject:

¹² Grant, Wm. R., *Lecture introductory to a course on Anatomy and Physiology in the Med. Dept. of Pennsylvania College, delivered October 13, 1851*; 8°, Phila., 1852, 1-16. Meigs, Charles D., M.D., *A memoir of Samuel G. Morton, M.D., read Nov. 6, 1851*, published Phila., 1851, 8°, 1-48.

¹³ *Crania Americana*, preface, et seq.

¹⁴ Morton, S. G., *Account of a Craniological Collection*, *Trans. Amer. Ethnol. Soc.*, N. Y., 1848, II, 217-218.

The different forms of the skull, as exhibited in the Five Races of Men. Strange to say, I could neither buy nor borrow a cranium of each of these races; and I finished my discourse without showing either the Mongolian or the Malay. Forcibly impressed with this great deficiency in a most important branch of science, I at once resolved to make a collection for myself." The results of this resolution were that between 1830 and 1851, the latter the year of his death, Morton gathered no less than 968 racial crania, which, with 67 additional specimens that came soon after his death, constituted by far the largest and most valuable collection of anthropological materials then in existence.

With the augmentation of his collection grew evidently also Morton's interest in craniological research and in anthropology in general, leading eventually, with such additional stimuli as were furnished by the writings of Prichard, Lawrence, Humboldt, and possibly Anders Retzius, to active personal investigations in these lines. Finding an efficient helping hand in John S. Phillips, Esq., a much interested and ingenious member of the Academy, Morton undertook the large task of measuring and describing his material, and the American collections received first attention. A very sensible schedule of measurements was formulated on the imperfect basis then extant; instruments where insufficient or lacking were improved or invented, and after "some years of toil and anxiety" sufficient data were gathered and excellent illustrations provided for an important publication.

In 1839 Morton was appointed Professor of Anatomy in Pennsylvania Medical College, and in the same year his truly monumental work for that time, *Crania Americana*, appeared, a volume not financed by any publisher or institution, but undertaken by the author with the assured support of only fifteen subscribers!

This first and largest work of Morton makes manifest some of the defects of the early period in anthropology; it includes a chapter on phrenology, though it is the physiological phrenology of Morton's time and has no trace of the charlatanism later associated with the name; but these defects are slight when contrasted with the large bulk of astonishingly good work and the number of sound conclusions. One wonders at the nearness with which the measurements employed by Morton correspond with later and even present-day measurements in that line, and at the soberness and clear-sightedness of his deductions. Concerning phrenology, it is evident that Morton's interest in that branch was not that of a believer or promoter, but rather that of a

friendly and hopeful investigator.¹⁵ As to the lithographic illustrations of the work, they have not been excelled since in beauty and accuracy.

Morton's principal aims in preparing and publishing the *Crania Americana* were, in his own words, "to give accurate delineations of the skulls" representing as many Indian nations, from all parts of the American continent, as he could bring together in his collection; to show the position of the American crania with reference to those of other races; and to determine "by the evidence of osteological facts, whether the American aborigines of all epochs have belonged to one race or to a plurality of races." But thus early Morton gave attention also to the artificial deformation of skulls, and especially to the determination of the internal cranial capacity in various races, taking cognizance not only of the entire skull cavity but of its main subdivisions as well. Moreover he presented, in 62 pages of his work, an excellent review of the contemporary anthropological knowledge of peoples in all parts of the world, a summary which shows good discrimination and much erudition.

The craniometric methods of Morton (and Phillips) call for special note. Not counting the more complex determinations of the facial angle and internal capacity, Morton took on each skull ten measurements; and of these the most important six were measured from precisely the same landmarks and in the same way as they are taken today under the recent Monaco agreement, though Morton was not remembered at that convention. These measurements and the manner in which they were made are, in the words of Morton¹⁶ himself, as follows:

"The *longitudinal diameter*, measured from the most prominent part of the os frontis, between the superciliary ridges, to the extreme end of the occiput.

"The *parietal diameter*, measured between the most distant points of the parietal bones. . . .

"The *vertical diameter*, measured from the fossa between the condyles of the occiput bone,¹⁷ to the top of the skull.

"The *occipito-frontal arch*, measured by a tape over the surface of the cranium, from the posterior margin of the foramen magnum to the suture which connects the os frontis with the bones of the nose.

"The *horizontal periphery*, measured by passing a tape around the cranium so as to touch the os frontis immediately above the superciliary ridges, and the most prominent part of the occipital bone.

¹⁵ See prologue by John S. Phillips, Esq., in *Crania Americana*.

¹⁶ *Crania Americana*, 249-250.

¹⁷ The present *basion*.

"The *zygomatic diameter* is the distance, in a right line, between the most prominent points of the *zygomæ*."

The terms used in describing the measurements are perhaps not always quite as specific as those which would be employed today, eight decades later, but the meaning is unmistakably identical. The four other measurements, which now are no more or but seldom employed, were the *frontal diameter*, taken between the anterior-inferior angles of the parietal bones, the *inter-mastoid arc and line*, and the *joint length of the face and vault*.

The *facial angle* was measured directly by an improved *facial goniometer*, while for obtaining the *internal capacity* of the skull a method was invented which, though seldom if ever duly credited, served and still serves as the basis of all subsequent procedures for obtaining this important determination with dry substances. Morton's description of the method, which well deserves to be quoted in full, is as follows:¹⁸

"*Internal Capacity*.—An ingenious mode of taking this measurement was devised by Mr. Phillips, viz: a tin cylinder was provided about two inches and three-fourths in diameter, and two feet two inches high, standing on a foot, and banded with swelled hoops about two inches apart, and firmly soldered, to prevent accidental flattening.—A glass tube hermetically sealed at one end, was cut off so as to hold exactly five cubic inches of water by weight, at 60° Fahrenheit. A float of light wood, well varnished, two and a quarter inches in diameter, with a slender rod of the same material fixed in its centre, was dropped into the tin cylinder; then five cubic inches of water, measured in the glass tube, were poured into the cylinder, and the point at which the rod on the float stood above the top of the cylinder, was marked with the edge of a file laid across its top; and the successive graduations on the float-rod, indicating five cubic inches each, were obtained by pouring five cubic inches from the glass tube *gradatim* and marking each rise on the float-rod. The graduations thus ascertained, were transferred to a mahogany rod fitted with a flat foot, and then subdivided, with compasses, for the cubic inches and parts. In order to measure the capacity of a cranium, the foramina were first stopped with cotton, and the cavity was then filled with *white pepper seed* poured into the foramen magnum until it reached the surface, and pressed down with the finger until the skull would receive no more. The contents were then transferred to the tin cylinder, which was well shaken in order to pack the seed. The mahogany rod being then dropped down with its foot resting on the seed, the capacity of the cranium in cubic inches is at once read off on it."

The most important scientific conclusions arrived at by Morton in his studies of American crania and their comparison with similar mate-

¹⁸ *Crania Americana*, 253.

rial from other parts of the world, conclusions which he held strongly to the end of his life, were that: (1) "The American nations, excepting the Polar tribes (Eskimo), were of one Race and one Species, but of two great Families (Toltecan and Barbarous), which resemble each other in physical, but differ in intellectual character;" and that: (2) "The cranial remains discovered in the Mounds, from Peru to Wisconsin, belong to the same race (the Indian), and probably to the Toltecan family."¹⁹ These conclusions subverted the numerous loosely formed but commonly held theories respecting the racial complexity of the American natives, as well as those of a racial separateness of the "Mound-builders" from the rest of the American Indians.

Besides this, Morton's work must have proved highly useful as a contemporary compendium of anthropological knowledge; it established the main proportions of the skulls of many American tribes; it gave comparisons of skull capacity in series of skulls representing the five human races of Blumenbach's classification; it shed considerable light on the subject of artificial deformation of the head among the American natives; and it gave for the first time excellent illustrations, both plates and figures, of many American crania, which could safely be used in comparative work by investigators to whom original American skulls were not accessible.

The few erroneous statements and conclusion included were due entirely either to imperfect contemporaneous knowledge in anthropology, or to inadequate material. The latter deficiency, for example, was directly responsible for Morton's opinion, supported by ten skulls which he called "Mongolian" but which were in reality only those of Chinese and Eskimo, that the American race differed essentially from all others, not excepting the Mongolian.²⁰ The terms "Toltecan" and "Barbarous" were also, we now know, misnomers, and the classification of all the Indians into these two families was erroneous, though when it was made it served a good purpose as a basis for further investigation.

Morton intended to follow the *Crania Americana* with a "supplementary volume," in which to "extend and revise both the Anatomical and Phrenological tables, and to give basal views of at least a part of the crania delineated;" also to "measure the anterior and posterior chambers of the skull in the four exotic races of man, in order to institute a comparison between them respectively, and between these and

¹⁹ *Crania Americana*, 260; also 62 et seq.

²⁰ *Ibid.*, 260.

those of the American Race.”²¹ This was never accomplished. Nevertheless the remainder of Morton’s life was largely devoted to anthropology, the result being the publication of more than twenty anthropological papers on subjects relating in the main, but by no means exclusively, to America. The most important of these publications, and one that compares favorably in clearness of presentation, and the validity and advanced nature of its conclusions, with the *Crania Americana*, was his *Crania Aegyptiaca*, published in 1844 and dealing with one hundred old and thirty-seven modern Egyptian skulls, procured for Morton by a United States consul at Cairo and subsequently himself an anthropological author of note—George R. Gliddon. Without entering into details about the work, it will be sufficient to say that Morton recognized definitely that “the valley of the Nile, both in Egypt and in Nubia, was originally peopled by a branch of the Caucasian race;” and that “the present Fellahs are the lineal and least mentioned descendants of the ancient Egyptians; the latter being collaterally represented by the Tuaregs, Kabyles, Siwahs, and other remains of the Lybian family of nations.”

Of his remaining papers the more noteworthy were those on a “Method of Measuring Cranial Capacity;” “On Hybridity of Animals;” on “The Size of the Brain in Various Races and Families of Man;” and on the “Physical Type of the American Indians.”

Following is Morton’s complete anthropologic bibliography; besides these works, however, he published an excellent textbook on *Human Anatomy*.

Crania Americana. 4°. Phila., 1839.

Method of measuring cranial capacity. Proc. Acad. Nat. Sci. Phila., 1841, I, 7-8.

Mexican *Crania* (Otomi, Chechemec, Tlascalan, Aztec). Proc. Acad. Nat. Sci. Phila., 1841, I, 50-51.

Cranial sutures. Proc. Acad. Nat. Sci. Phila., 1841, I, 68-69.

Pigmy “race” of Mississippi valley. Proc. Acad. Nat. Sci. Phila., 1841, I, 215-216.

Negro skulls, capacity. Proc. Acad. Nat. Sci. Phila., 1841, I, 135.

Yucatan (Ticul) skeleton. Proc. Acad. Nat. Sci. Phila., 1842, I, 203-204.

Observations on Egyptian ethnography, derived from anatomy, history, and the monuments. Trans. Amer. Philos. Soc. Phila., 1843, ix, 93-159.

Crania Aegyptiaca. 4°, Phila., 1844.

Observations on a second series of ancient Egyptian crania. Proc. Acad. Nat. Sci. Phila., 1844, II, 122-126.

²¹ *Crania Americana*, preface v.

- Observations on the measurements of the internal capacity of the crania deposited [by Morton] this evening. *Proc. Acad. Nat. Sci. Phila.*, 1844, II, 168.
- The skull of a Hottentot. *Proc. Acad. Nat. Sci. Phila.*, 1844, II, 64-65.
- Two ancient Peruvian heads from Atacama, deformed. *Proc. Acad. Nat. Sci. Phila.*, 1845, II, 274.
- Skull of a Congo negro. *Proc. Acad. Nat. Sci. Phila.*, 1845, II, 232-233.
- Skulls of New Hollanders (Australians). *Proc. Acad. Nat. Sci. Phila.*, 1845, II, 292-293.
- Remarks on an Indian cranium found near Richmond, on the Delaware, and on a Chenook mummy. *Proc. Acad. Nat. Sci. Phila.*, 1847, III, 330.
- On an aboriginal cranium obtained by Dr. Davis and Mr. Squier from a mound near Chillicothe, Ohio. *Proc. Acad. Nat. Sci. Phila.*, 1847, III, 212-213.
- Skeletal remains from Arica, Peru. *Proc. Acad. Nat. Sci. Phila.*, 1848, III, 39-40.
- On hybridity of animals, considered in reference to the question of the unity of the human species. *Proc. Acad. Nat. Sci. Phila.*, 1848, III, 118-121.
- On the position of the ear in the ancient Egyptians. *Proc. Acad. Nat. Sci. Phila.*, 1848, III, 70.
- The catalogue of skulls of man and the inferior animals, in the collection of Samuel G. Morton, M.D., Phila., 1849 (with two subsequent editions).
- Observations on the size of the brain in various races and families of man. *Proc. Acad. Nat. Sci. Phila.*, 1850, IV, 221-224.
- Four skulls of Shoshonee Indians. *Proc. Acad. Nat. Sci. Phila.*, 1850, IV, 75-76.
- Ancient Peruvian crania from Pisco. *Proc. Acad. Nat. Sci. Phila.*, 1850, IV, 39.
- Observations of a Hottentot boy. *Proc. Acad. Nat. Sci. Phila.*, 1850, IV, 5-6.
- Physical type of the American Indians. In Schoolcraft, *Indian Tribes*, Phila., 1852, II, 316-330. Unity of the human race, *ibid*, III, 374-375.

EFFECTS OF MORTON'S WORK

Under Morton's stimulus and with his coöperation, physical anthropology of the American Indian received attention in a number of important ethnological and archeological works published before or soon after his decease. Thus the first scientific memoir published by the Smithsonian Institution, the highly creditable Squier and Davis's "Ancient Monuments of the Mississippi Valley,"²² included five pages of text and two excellent plates on the "Crania from the Mounds." The main part of this report was by Morton himself. One skull only is described, but it was a very good, undeformed or but very slightly deformed specimen, derived from an ancient mound in Scioto valley, Ohio. For comparison there are given measurements of 308 mounds, "tumuli," and Indian crania²³ of different ages and from different parts of the North American continent and Peru. Curiously, and against the

²² *Smithsonian Contributions to Knowledge*, N. Y., 1848, I, 288-292, pl. XLVII-XLVIII.

²³ Mainly from Morton's *Crania Americana*.

previously expressed conclusion of Morton, Squier and Davis assumed in this connection that there had existed a special "race of the mounds," the skull described "belonging incontestably to an individual of that race." Regarding skeletal remains from the mounds in general, however, the authors well recognized that these were "of different eras," the superficial burials being comparatively late and to be ascribed to the Indian tribes in occupancy of the country at the period of its discovery.

In the same year (1848), appeared the second volume of the *Transactions of the American Ethnological Society*, which contains important ethnological contributions and maps by Hale and Gallatin, in an article on the "Indians of North America." Neither of these contributions added directly to physical anthropology, but both contained valuable data on the early distribution of the North American Indians, on the population of some of the tribes, and on their environment. There are notes on the physical appearance of the Indians of various types,²⁴ but these are quite imperfect. In the same volume also appears Morton's "Account of a craniological collection, with remarks on the classification of some families of the human race."²⁵ This brief contribution is interesting partly because in it Morton shows in a few words how he was led to the collection and study of American crania, and partly because he reiterates his conviction as to the racial unity of all the American nations, barring the Eskimo.²⁶

Even more important than both of the works heretofore mentioned in this section, was the great encyclopedia of knowledge concerning the American Indian, prepared by a special provision of the United States Congress under the auspices of the Bureau of Indian Affairs, by Henry R. Schoolcraft, in collaboration with a number of other authors, and published between 1851 and 1857.²⁷ This work gave much reliable in-

²⁴ Particularly in Hale, chapter Ethnology, 5-8.

²⁵ Pp. 217-222.

²⁶ P. 218: "The anatomical facts considered in conjunction with every other species of evidence to which I have had access, lead me to regard all the American nations, except the Esquimaux, as people of one great race or group. From Cape Horn to Canada, from ocean to ocean, they present a common type of physical organization, and a not less remarkable similarity of moral and mental endowments."

²⁷ Complete title: *Historical and Statistical Information respecting the History, Condition and Prospects of the Indian Tribes of the United States, collected and prepared under the direction of the Bureau of Indian Affairs: per act of Congress of March 3d, 1847*, by Henry R. Schoolcraft, LL.D. 6 vols., 4°, Phila., 1851-1857.

formation on the geographic distribution of the Indian tribes in North America; on their migration; on family conditions of the Indian, including birth and death; on the intellectual capacity of the Indian; and on the statistics and population of the tribes. Besides this, it included a series of articles dealing directly with the physical anthropology of the native. These comprised the "Essay on the physical characteristics of the Indian," by Samuel G. Morton (II, 315-330); "Admeasurements of the crania of the principal groups of Indians of the United States," by J. S. Phillips (II, 331-335); "Examination and distribution of the hair of the head of the North American Indian," by Peter A. Browne, LL.D. (III, 375-393); "Considerations on the distinctive characteristics of the American aboriginal tribes," by Dr. Samuel Forrey (IV, 354-365); together with "Unity of the human race" (373-375), "Remarks on the means of obtaining information to advance the inquiry into the physical type of the Indian" (IV, 345-353), and "The aboriginal features and physiognomy" (V, 287-292), by Schoolcraft himself.

Meanwhile also a number of publications appeared in the United States bearing on physical anthropology, which were incited not so much by Morton as by Lawrence (*Lectures on the Natural History of Man*) and especially Prichard (*Natural History of Mankind*), in England. Three volumes belonging to this category were *The Races of Man*, by Dr. Charles Pickering (*Publications of the United States Exploring Expedition*, 4°, Boston, 1848); the *Natural History of Man*, by Wm. N. F. Van Amringe (8°, New York, 1848); and *The Natural History of the Human Species*, by Lieutenant Colonel Charles Hamilton Smith (8°, Boston, 1851).

These volumes, as seen in part from their titles, deal comprehensively and more or less philosophically with mankind as a whole. The two more valuable ones were those of Smith and Pickering, both presenting good summaries of contemporaneous knowledge of the subjects with which they deal. Van Amringe wrote on the basis of biblical data; nevertheless his book also contained many a good thought. The works of both Smith and Pickering were published later in new editions, the former in 1859 (Boston), with additions by Dr. S. Kneeland; and the latter in 1854 (London), with *An Anatomical Synopsis of the Natural History of Man*, by Dr. John Charles Hall.

The influence of these publications was more of a general nature. They were largely read, educating and influencing the public mind on a subject which was then claiming a large share of the attention of all thoughtful minds, without actually adding much to existing knowledge or stimulating intensive research.

During the latter part of the first and the early part of the second half of the nineteenth century, there were several other important occurrences the results of which served to enhance interest in anthropology in this country, particularly in that of the American aborigines. These were the numerous Government exploring expeditions to the far Northwest, West, and Southwest, under Wilkes (1838-'42), Frémont (1842-'44), Emory (1846-'47), Stansbury (1849), and others; and the extensive Pacific Railroad Surveys of 1853-'54, comprising the explorations of Parke, Whipple, Pope, Stephens, Williamson, and their companions. They helped in preparing the ground for the eventual establishment of the Bureau of American Ethnology.

MORTON'S SUCCESSORS—JOSEPH LEIDY AND J. AITKEN MEIGS

From what precedes it is plain that Morton may justly and with pride be termed the father of American anthropology; yet it must be noted with regret that, like others later on, he was a father who left many friends to the science and even followers, but no real progeny, no disciples who would continue his work as their special or life vocation.

The collection of crania which Morton assembled was purchased from his executors, for the sum of \$4,000, by forty-two gentlemen of Philadelphia and presented to The Academy of Natural Sciences in that city, where it rests a lonesome relic to the present day; the Academy, whether owing to lack of scholars or for other reasons, failing to provide for further research in connection with the precious material, or for systematic accessions. What might not the Academy have been to American anthropology had circumstances been different! However, the time was doubtless not quite ripe.

As it was, two men were approached with a view to continuing Morton's work, either of whom would have made a thorough success of the undertaking had he been in a position to devote himself exclusively to anthropology. They were Joseph Leidy and J. Aitken Meigs. According to Leidy²⁸ "after the death of Dr. Morton, it was proposed to me to take up the investigation of the cranial characteristics of the human races, where he had left it, which I omitted, not from a want of interest in ethnographic science, but because other studies occupied my time. Having, as Curator of the Academy of Natural Sciences, the charge of Dr. Morton's extensive cabinet of human crania, I confided the undertaking to Dr. Meigs. . . ."

²⁸ In Nott and Gliddon's *Indigenous Races of the Earth*, 8°, Phila., 1857, p. xvi.

Dr. J. Allen Meigs, eventually professor of climatology, physiology, and the institutes of medicine in several colleges of Philadelphia and an indefatigable worker,²⁹ endeavored, so far as his medical preoccupations allowed, to pick up the threads where broken by Morton's death, and in the course of sixteen years (1850-1866) contributed a number of good papers to anthropology. The most important of these were "The Cranial Characteristics of the Races of Men," in Nott and Gliddon (1857), with extensive bibliography; the *Catalogue of Human Crania in the Collection of the Academy of Natural Sciences of Philadelphia* (1857), a continuation of Morton's Catalogue, which meanwhile had reached the third edition; the *Observations on the Occiput in Various Races* (1860); the *Hints to Craniographers* (1858), which includes the first comprehensive data on other cranial collections then in existence, both here and in Europe; and the *Mensuration of the Human Skull* (1861), which, besides referring to much of the earlier history of anthropometry, gives clear directions for 48 cranial measurements and determinations.

In appraising Meigs' anthropological work as a whole, it is felt with regret that he was not all to the science that he could and should have been. His writings show much knowledge of the field, minute application and considerable erudition, but they do not go far enough; they are only good by-products of a mind preoccupied in other though more or less related directions. Meigs also like Morton left no disciples.

The bibliography of his anthropological contributions follows:

Description of a deformed, fragmentary human skull, found in an ancient quarry-cave at Jerusalem; with an attempt to determine by its configuration alone the ethnical type to which it belongs. *Proc. Acad. Nat. Sci. Phila.*, 1850, xi, 262-280.

On Dr. Morton's collection of human crania. *Proc. Acad. Nat. Sci. Phila.*, 1855, 420.

Catalogue of human crania in the collection of the Academy of Natural Sciences of Philadelphia. *Proc. Acad. Nat. Sci. Phila.*, 1856, Suppl.

The cranial characteristics of the races of men. In Nott and Gliddon's *Indigenous Races of the Earth*, 8°, Phila., 1857, 203-352.

Hints to craniographers—upon the importance and feasibility of establishing some uniform system by which the collection and promulgation of craniological statistics, and the exchange of duplicate crania, may be provided. 8°, 1-6, Phila. 1858 (?), with *Proc. Acad. Nat. Sci. Phila.*, for 1858, and separately.

Observations upon the form of the occiput in the various races of men. *Proc. Acad. Nat. Sci. Phila.*, 1860, xii, 397-415.

²⁹ Born at Philadelphia, 1829, died 1879. Biography by Geo. Hamilton in *Trans. Med. Soc. Pa.*, Phila., 1880, 1-22. For other biographic notices see under Meigs in *Catalogue of the Library of the Surgeon General, U. S. A.*

The mensuration of the human skull. North-Amer. Med. Chirurg. Review, Sept., 1861, 837-861.

Observations upon the cranial forms of the American aborigines, based upon specimens contained in the collection of the Academy of Natural Sciences of Phila. Proc. Acad. Nat. Sci. Phila., 1866, 197.

Description of a human skull in the collections of the Smithsonian Institution (from Rock Bluff, Ill.), Smithsonian Report for 1867, 412-414.

Meanwhile Dr. Joseph Leidy (1823-'91), later Professor of Anatomy in the University of Pennsylvania, Curator of the Academy of Natural Sciences, and an eminent naturalist, did not wholly abandon his interest in anthropology. As will be seen from the appended list of his writings he published a number of smaller contributions of more or less direct interest to the science, all of which bear the mark of an able and conscientious observer. Among other things those of us who are more closely interested in human antiquity owe to him one of the earliest and clearest statements regarding the unreliability of fossilization of bones as a criterion of antiquity. His words on this point, which might well be borne in mind by some of our present paleontologists, are as follows:³⁰ "Bones of recent animals, when introduced into later deposits, may in many cases very soon assume the condition of the fossils belonging to those deposits. Fossilization, petrification, or lapidification is no positive indication of the relative age of the organic remains. . . ."

As well known, it was Professor Leidy to whom the fossil pelvic bone of Natchez, and the variously petrified human bones from the west coast of Florida, were submitted for examination, which resulted in the opinion that they were not necessarily of any great antiquity, though he was inclined to believe that the native American had "witnessed the declining existence of the Mastodon and Megalonyx" on this continent, and that man may have been a companion in America of the latest prehistoric horse.

Among the more than five hundred published contributions to natural science by Leidy, the following are of interest to anthropology:

On the cranium of a New Hollander. Journ. & Proc. Acad. Nat. Sci. Phila., 1847, 217.

On the hair of a Hottentot boy. Jour. & Proc. Acad. Nat. Sci. Phila., 1848, 7.

Observations on the existence of the intermaxillary bone in the embryo of the human subject. Proc. Acad. Nat. Sci. Phila., 1848-1849, iv, 145-147.

³⁰ In his article on human paleontology, Nott and Gliddon's *Indigenous Races of the Earth*, 1867, p. xviii, footnote.

- On a so-called fossil man. Proc. Acad. Nat. Sci. Phila., 1855, 340.
 (On human paleontology.) In Nott and Gliddon's *Indigenous Races of the Earth*, 8°, Phila., 1857, xvi-xix.
 On an acephalous child. Proc. Acad. Nat. Sci. Phila., 1858, 8.
 On blood crystals. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 9.
 On the cause of monstrosities. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 9.
 On sections of the human cranium. Proc. Acad. Nat. Sci. Phila., 1858, Biol. 10.
 Exhibition of the lower jaw of an aged man. Proc. Acad. Nat. Sci. Phila., 1870, 133.
 On the reversed viscera of a human subject. Proc. Acad. Nat. Sci. Phila., 1870, 134.
 Anomalies of the human skull. Proc. Acad. Nat. Sci. Phila., 1888, 273.
 Notice of some fossil human bones. Trans. Wagner Free Institute of Science, Phila., 1889, II, 9-12.

J. C. NOTT AND GEORGE R. GLIDDON

Besides J. Aitken Meigs and Joseph Leidy, there were two other men who were closely associated with Morton in his anthropological work and who subsequently endeavored to fill at least a part of the void left by his death. They were Dr. J. C. Nott, of Mobile, Alabama, and Mr. George R. Gliddon of Philadelphia, formerly U. S. Consul at Cairo and a large contributor to Morton's cranial collections.

Aided in the beginning by Morton himself and supplementing their work by contributions from Agassiz, Leidy, Meigs, Usher, Patterson, and others, Nott and Gliddon published in 1854 a volume on the *Type of Mankind*, which by 1871 reached the tenth edition; and in 1857 this was followed by a volume on the *Indigenous Races of the Earth*, which also had a large circulation.

The scope of these works, which exercised considerable influence on the public mind of their time, can best be appreciated from an enumeration of their main sections, which were:

"THE TYPES OF MANKIND"

Memoir of Samuel George Morton.

The natural provinces of the animal world and their relation to the different types of man, by Prof. L. Agassiz.

Geographical distribution of animals and the races of man.

Types of mankind.

Excerpts from Morton's unedited manuscripts on "The Size of the Brain in various Races and Families of Man;" and on "Origin of the Human Species."

Geology and paleontology in connection with human origins, by W. Usher, M.D.

Hybridity of animals viewed in connection with the natural history of mankind; and comparative anatomy of races, by J. C. Nott, M.D.

"INDIGENOUS RACES OF THE EARTH"

Contribution by Leidy on "Human Paleontology;" with a letter on "Primitive Diversity of the Races of Man" and "The Reliability of Philological Evidence," by L. Agassiz.

Distribution and classification of tongues, by Alfred Maury.

Iconographic researches on human races and their art, by Francis Pulszky.

The cranial characteristics of the races of man, by J. Arthur Meigs.

Acclimation; or the comparative influence of climate and endemic and epidemic diseases on the races of man, by J. C. Nott.

The Monogenist and the Poligenist, by George R. Gliddon.

It is to be regretted that these publications, and particularly the *Types of Mankind*, were strongly attached to the biblical traditions, more than three hundred pages of the later volume being devoted to efforts at harmonizing the results of the rising science with the biblical Genesis.

Another serious defect of the two works was a dearth of data based on actual field or laboratory research. They bore on the whole the stamp of popular science rather than that of reports on scientific investigation. So they were evidently also received, and on that basis reached their extensive circulation. They have not advanced or benefited physical anthropology in this country to any material extent, and are now but seldom referred to.

ANTHROPOLOGY IN BOSTON

GEORGE PEABODY; JEFFRIES WYMAN

It now becomes necessary to leave Philadelphia for a while and return to Boston. Here, in 1866, takes place an event which from the beginning is destined to have a marked influence on the development of Physical Anthropology in this country. This is the foundation of the Peabody Museum of American Archeology and Ethnology, together with the Peabody Professorship in the same subjects, at the Harvard University,³¹ by George Peabody, the great American philanthropist of that time.

³¹ In a letter transmitting the gift to the future Trustees of the Museum we read as follows: "Accompanying this letter, I inclose an instrument giving to you one hundred and fifty thousand dollars (\$150,000), in trust for the foundation and maintenance of a Museum and Professorship of American Archaeology and Ethnology in connection with Harvard University Aside from the provisions of the instrument of gift, I leave in your hands the details and management

Jeffries Wyman is appointed the first Curator of the Museum, and the beginnings of its collections are thus described in his first report:

"On the 9th of November, 1866, a collection of various objects pertaining to the purposes of this Museum was begun, and temporarily deposited in one of the cases of the Museum of Comparative Anatomy, in Boylston Hall. The collection consisted of crania and bones of North-American Indians, a few casts of crania of other races, several kinds of stone implements, and a few articles of pottery,—in all, about fifty specimens. Of these, about one-half belonged to Harvard College, and, with the consent of the President, were transferred to this Museum; the others were from the collections of the Curator."³²

To this was soon added another collection, consisting of 75 crania, chiefly of ancient Peruvians, with a Peruvian mummy, donated by E. George Squire; and thenceforth, as seen from the reports of the Curators, no year elapses without important additions being made to the Museum collections in Physical Anthropology.

As to Jeffries Wyman, his services to American anthropology deserve more than a brief notice.

Wyman was born at Chelmsford, Massachusetts, August 11, 1814. He studied at Harvard, and in 1837 graduated in medicine. Finding difficulty in securing a favorable opportunity for practice, he became Demonstrator of Anatomy at Harvard College; but his earnings were so small that to eke out his subsistence he was obliged at the same time to become a member of the Boston fire department.³³ In 1840, however, he was appointed Curator of the Lowell Institute. In 1840–1841 he delivered at the Institute his well-known course of twelve lectures on comparative anatomy and physiology, and with the money thus earned went to Europe for further studies. At Paris, he devoted himself to comparative anatomy and physiology, and here in all probability he also became acquainted more directly with the beginnings of physical

of the trust; only suggesting, that, in view of the gradual obliteration or destruction of the works and remains of the ancient races of this continent, the labor of exploration and collection be commenced at as early a day as practicable; and also, that, in the event of the discovery in America of human remains or implements of an earlier geological period than the present, especial attention be given to their study, and their comparison with those found in other countries." (Signed) George Peabody. See *First Ann. Report Peabody Museum*, Boston, 1868, 25–26.

³² *First Ann. Report Peabody Museum*, Boston, 1868, 5.

³³ Asa Gray: *Jeffries Wyman. Memorial Meeting of the Boston Society of Nat. History*, 8°, 1874, 1, 1–37. Also Memoir of Jeffries Wyman by A. S. Packard, *Nat. Acad. Sci.*, pub. 1878, 75–126.

anthropology. In 1843 he accepted the chair of anatomy and physiology at Hampden-Sidney College, Virginia; and in 1847 he was appointed to succeed Doctor Warren as Hersey Professor of Anatomy at Harvard College.

In 1852 Jeffries Wyman began, on the occasion of a necessary trip to the South for his health, an exploration of the shell-mounds in Florida. In 1856 he penetrated deep into Surinam, and two years later traveled extensively with George A. Peabody,³⁴ through Argentina, across the Andes to Chile, and back by way of Peru and Panama. In 1866, when "failing strength demanded a respite from oral teaching," he was named by George Peabody one of the seven trustees of the newly founded Peabody Museum, at the same time becoming the first Professor of American Archeology and Ethnology at Harvard University and a curator of the museum.

Long before his connection with the Peabody Museum, Wyman began to assemble collections in comparative anatomy, including some human material; and while a curator of the museum he brought together an important collection of human crania, the foundation of the present large somatological collections of that institution.

Wyman died of pulmonary hemorrhage September 4, 1874. He left no great published works, but a large number of valuable smaller contributions, many of which relate to or deal directly with physical anthropology. He gave us our first more precise osteological knowledge of the gorilla; he investigated conscientiously the human crania at the Peabody Museum, and extended his studies to the bones of the limbs, pointing out for the first time the prevalence of platynemy in the Indian; he gave an excellent description of the shell-heaps of Florida and their human skeletal remains; and he was at the time of his death "undisputably the leading anthropologist of America" (Packard).

That the premature demise of Jeffries Wyman was a great loss to our branch of science will be seen from the following list of publications showing his anthropological and related activities:

Observations on the external characters, habits, and organization of the *Troglodytes niger*, Geof. Boston Jour. Nat. Hist., 1843-1844, iv, 362-376, 377-386.
 Notice of the external characters, habits, and osteology of *Troglodytes gorilla*, a new species of ourang from the Gaboon river. Boston Jour. Nat. Hist., 1845-1847, v, 417-422; Ann. Sci. Nat., 1851, xvi, (Zool.) 176-182; Proc. Boston Nat. Hist. Soc., 1845-1848, ii, 245-248; Amer. Jour. Sci., 1849, viii, 141-142.

³⁴ Geo. A. Peabody, of Salem, should not be confused with George Peabody, the founder of the Museum.

- A new species of Troglodytes. Silliman's Jour., 1848, v, 106-107.
- Twelve lectures on comparative physiology, 8°, Boston, 1849, 72 pp.
- A description of two additional crania of the *engé-ena* (*Troglodytes gorilla*, Savage and Wyman) from Gaboon, Africa (1849). Proc. Boston Soc. Nat. Hist., III, 1848-51, 179; Amer. Jour. Sci., 1850, ix, 34-45; New Phil. Journ. Edinb., 1850, xlviii, 273-286.
- On the crania of Indians. Proc. Boston Soc. Nat. Hist., 1851-1854, iv, 83-84.
- Description of the post-mortem appearances in the case of Daniel Webster. American Jour. Med. Sci., Jan., 1853.
- Dissection of a black Chimpanzee (*Troglodytes niger*). Proc. Boston Soc. Nat. Hist., 1854-56, v, 274-275.
- On the cancellated structure of some of the bones of the human body (1849). Jour. Boston Soc. Nat. Hist., 1857, vi, 125-140.
- Account of the dissection of a human foetus. Proc. Bost. Soc. Nat. Hist., Feb. 3, 1858.
- Account of the collection of gorillas made by Mr. Du Chaillu. Proc. Bost. Soc. Nat. Hist., Jan. 4, 1860.
- On bones of a gorilla recently obtained in western equatorial Africa. Proc. Bost. Soc. Nat. Hist., Oct. 2, 1861.
- Dissection of a Hottentot. Proc. Bost. Soc. Nat. Hist., April 2, 1862.
- On the development of the human embryo. Proc. Bost. Soc. Nat. Hist., Dec. 3, 1862.
- Observations on the cranium of a young gorilla. Proc. Boston Soc. Nat. Hist., 1863, iv, 203-206.
- On the skeleton of a Hottentot (1863). Proc. Bost. Soc. Nat. Hist., 1865, ix, 352-357; Anthropol. Review, III, 1865, 330-335.
- On malformations. Proc. Bost. Soc. Nat. Hist., Oct. 19, 1864.
- On Indian mounds of the Atlantic coast. Proc. Bost. Soc. Nat. Hist., Nov. 2, 1864.
- On the distorted skull of a child from the Hawaiian islands. Proc. Bost. Soc. Nat. Hist., Oct. 17, 1866.
- Measurements of some human crania. Proc. Bost. Soc. Nat. Hist., Nov. 20, 1867.
- On symmetry and homology in limbs (1867). Proc. Bost. Soc. Nat. Hist., 1868, xi, 246-278.
- Observations on crania. Proc. Bost. Soc. Nat. Hist., 1868, ix, 440-462. Also Observations on crania and other parts of the skeleton. Fourth Annual Report of the Peabody Museum, 1871, 10-24.
- On the fresh-water shell heaps of the St. John's river, East Florida. American Naturalist, 1869, II, 393-403, 449-463.
- Human remains in the shell heaps of the St. John's river, East Florida. Cannibalism. American Naturalist, 1874, VIII, 403-414, also 7th Ann. Report of Peabody Museum, 1874, I, 26-37.
- Remarks on cannibalism among the American aborigines. Proc. Bost. Soc. Nat. Hist., May 20, 1874.
- Fresh-water shell mounds of the St. John's river, Florida; Fourth memoir. Peabody Academy of Science, Salem, Mass., 1875, 94, pl. I-IX.

LATER HISTORY OF ANTHROPOLOGY IN CONNECTION WITH THE HARVARD
UNIVERSITY

After Wyman, the history of physical anthropology in Boston, and later also in Worcester, Mass., is one that belongs, with two notable exceptions, to the realm of the living. The two exceptions apply to Frederick Ward Putnam and Henry P. Bowditch. Besides these there are to be mentioned Miss Studley, Lucien Carr and Frank Russell.

Prof. F. W. Putnam, recently deceased,³⁵ was one of the best friends and promoters physical anthropology has had in this country. Born at Salem, Mass., in 1839, and with only the "education imparted by the old style of private schools," he soon showed such an interest in natural history and such ability, that when barely 17 he was made Curator of Ornithology at the Essex Institute of Salem. In 1857 he came under the direct influence of Agassiz, whose assistant he remained until 1864. During this time he also completed his general education at Harvard and in 1864 returned to the Essex Institute as Curator of Vertebrates, to soon after become Director of the Institute, a position which he held until 1873. During this time he became one of the founders and collaborators of the *American Naturalist*, a journal which still exists and which in the course of its existence has rendered valuable service to Anthropology. In 1873 he was elected Permanent Secretary of the American Association for the Advancement of Science, a position which he held for twenty-five years, or until 1898, when he became President of the Association. In 1885 he became a member of the National Academy.

His interest in Anthropology became manifest soon after his coming to Harvard, his first publication in the line, "On Indian Graves on Winter Island, Salem," dating from 1865. He was especially attracted by archeology and his interest in the subject showed a steady increase until 1875, when following the death of Jeffries Wyman he was appointed Curator of the Peabody Museum of Archeology and Ethnology, Harvard University. It was with this Institution that he was most closely associated until his death, as Curator or Director, which he built up, and which, including its valuable collections in Physical Anthropology, will remain his chief monument.

³⁵ August 14, 1915. Biographic sketches by Edward S. Morse, *Hist. Coll's. Essex Institute*, 1915, LII, (repr. pp. 1-8); by A. L. Kroeber, *Amer. Anthropologist*, 1915, 712-718; by Charles Peabody, *L'Anthropologie*, 1916, 169-171; by F. Boas, in *Science*, Sept. 10, 1915, 330-332; and *ibid.*, Nov. 5, 1915, 638-639; detailed bibliography, by Frances H. Mead, in Putnam Anniversary Volume, 1909, 601-627.

In addition to his Museum work he was made in 1886 the Peabody Professor of Archeology at Harvard, a position which he held until 1909, when upon his retirement he became Professor Emeritus. In 1891 he was appointed Chief of the Department of Ethnology of the World's Columbian Exposition at Chicago and used this opportunity on the one hand for the assembling of important collections which became the foundation of the Field Columbian Museum (now Field Museum of Natural History), while on the other hand he initiated, assisted by Doctor Boas, extensive anthropometric observations on the North American tribes.

Between 1894 and 1903, in addition to his duties at Harvard he served also as Head Curator of the Department of Anthropology at the American Museum of Natural History, New York, built up great collections, including those in Physical Anthropology, and was instrumental in the organization of the Jesup and Hyde Expeditions, both of which included important researches in Physical Anthropology.

In 1903 he left his position in New York to accept that of Professor of Anthropology and Director of the Anthropological Museum at the University of California, carrying on these functions until 1909, the year of his retirement, conjointly with those at the Peabody Museum. In the latter he remained active until practically the end of his life.

The influence of Professor Putnam on the development of Physical Anthropology in the United States is only inadequately expressed by his publications. He was and remained essentially an archeologist, but he saw clearly the necessity of associating somatological with archeological and ethnological researches, and favored the development of both collections and investigations in the new line, in all the institutions with which he had connection. It was mainly through his kind offices that the writer was enabled to initiate his anthropological research among the American aborigines; he became one of his "boys" in 1898, and received valued encouragement from him until near his end.

In conclusion a few words seem due concerning Professor Putnam's position relating to the problem of early man on this continent. There is no question but that he was inclined to accept man's presence in America at a relatively early date; but he kept his mind open on this point and never reached a definite conclusion. In assigning to the author the study of the Trenton crania and later on those of the Trenton femur and the Calaveras skull, he never uttered a word to influence the results of the studies, and accepted the conclusions, even though disappointing, as quite final.

Professor Putnam's publications which touch more or less closely on Physical Anthropology are the following:³⁶

- On the great antiquity of Man. *Bulletin Essex Institute, Salem, 1872, iv, 168.*
 Note on ancient races of America, their crania, migrations, and greatest development in Mexico and Peru. *Ibid.*, 1872, 228-229.
 Notice of Indian skull from shellbed on Rock island, Illinois. *Bulletin Essex Institute, Salem, 1874, vi, 70-72.*
 Account of the scientific work of Professor Jeffries Wyman. Resolutions on his death. 1874, *Ibid.*, 152-153.
 On Indian and Esquimaux skulls, *Bulletin Essex Institute, Salem, 1876, viii, 66-67.*
 Remarks on some bones of New England Indians and on archaeological explorations in Tennessee. *Proc. Boston Society of Natural History, 1879, xx, 331-333.*
 The former Indians of Southern California, as bearing on the origin of the Red Man in America. Abstract, *Bulletin Essex Institute, Salem, 1880, xii, 4-6.*
 An Indian burial mound, *Science, Cambridge, 1883, i, 168.*
 Stone graves of the Cumberland valley. *Ibid.*, 292.
 Ancient cemetery at Madisonville, Ohio. *Ibid.*, 373-374.
 Abnormal human skull from stone graves in Tennessee. Abstract. *Proc. American Association Advancement of Science, Salem, 1883, xxxii, 390-392.*
 A new stand for skulls. Abstract. *Ibid.*, 392-393.
 Human foot-prints found in tufa near the shore of Lake Managua, Nicaragua. Abstract. *Proc. American Antiquarian Society, Worcester, 1884, n. s., iii, 92-93.*
 Human under-jaw found in gravel at Trenton, New Jersey. Abstract. *Ibid.*, 93.
 Obituary of Miss Cordelia A. Studley. *Proc. Boston Society of Natural History, 1887, xxiii, 419-420.*
 Palaeolithic man in eastern and central North America. A discussion before the Boston Society of Natural History. *Ibid.*, 421-424, 447-449.
 Palaeolithic man in eastern and central North America. A discussion before the Boston Society of Natural History. 1890, *Ibid.*, xxiv, 157-165. 6 ill.
 Remarks on early man in America. *Ibid.*, 468.
 Anthropology at Harvard University. (In *Recent Progress in American Anthropology*, edited by F. W. Hodge) *American Anthropologist, 1906, N. S., viii, 458-463.*
 Note on the "Calaveras Skull." *University of California Publications in Archaeology and Ethnology, Berkeley, 1907, vii, 128-129.*

Dr. Henry P. Bowditch (1840-1911), Professor of Physiology in the Harvard Medical School, has left us, besides his physiological writings, a number of direct contributions to physical anthropology, some of

³⁶ In this connection should be consulted also his numerous reports to the Peabody and American Museum, etc.

which are of great value. The most noteworthy ones were those reporting his investigations on the growth of children. These investigations, undertaken in the early seventies under the auspices of the Health Department of the Social Science Association of Boston, were stimulated by the results of researches on Belgian children published in Quetelet's *Anthropométrie* (Brussels, 1870). Their final object was "to determine the rate of growth of the human race under the conditions which Boston presented." The results contributed much to our knowledge of the laws controlling the growth of the child, and stimulated in turn all later investigations on the subject in this country.

The contributions of Professor Bowditch to anthropology are included in the following bibliography:

- The growth of children. 8th Ann. Rep. State Bd. Health of Mass., Boston, 1877, 1-51.
- The growth of children. (A supplementary investigation) with suggestions in regard to methods of research. 10th Ann. Rep. State Bd. Health of Mass., Boston, 1879, 35-62.
- Relation between growth and disease. Trans. Am. Med. Asso., 1881, 9 pp.
- The physique of women in Massachusetts. 21st Ann. Rep. State Board of Health of Mass., Boston, 1889-90; Also in Med. Pub. Harvard Med. Sch., 20 pp., 1 table.
- The growth of children, studied by Galton's method of percentile grades. 22d Ann. Rep. State Bd. Health, Mass., Boston, 1891, 479-522.
- Are composite photographs typical pictures? McClure's Mag., N. Y., 1894, 331-342.

Returning to the Peabody Museum, we find associated there with Professor Putnam, for five years (1882-1886), Miss C. A. Studley, to whom we owe the creditable "Notes upon human remains from the caves of Coahuila, Mexico." (16th Ann. Rep. Peabody Mus., 1882, 233-259). She left the Museum in 1886 due to the necessity of obtaining a more remunerative position, but died shortly after.

Another of the earlier associates of Professor Putnam was Mr. Lucien Carr.

Lucien Carr (1829-1915), Assistant Curator of the Peabody Museum 1877-1894, though not, strictly speaking, a somatologist, was nevertheless actively interested in craniology and made a number of contributions to that subject. Unfortunately these suffer from some serious defects and have little value at the present time. They are as follows:

- Observations on the crania from the stone graves of Tennessee. Peabody Mus. Reports, Cambridge, Mass., 1876-79, II, 361-384.
- Measurements of crania from California. *Ibid.*, 497-505.

- Observations on the crania from the Santa Barbara Islands, California. Rep. U. S. Geog. Surveys West of 100th Meridian, Wash., 1879, vii, 277-292.
 Notes on the crania of New England Indians. Mem. Boston Soc. Nat. Hist., 1880; repr. 10 pp.

Frank Russell, Ph.D. (1868-1903), was unfortunately taken away too soon to be able to accomplish much for our branch of science. He was for several years Instructor in Anthropology at Harvard University and in charge of the anthropological laboratory of the Peabody Museum. In 1901 he also became associated temporarily with the Bureau of American Ethnology. He carried on explorations, partly anthropological and partly ethnological, among the tribes in northern Canada and among the Pima of Arizona, and published several contributions on craniological work. He succumbed to tuberculosis before his work could leave a lasting impression on American anthropology. Following is a list of his writings which bear more or less on our subject:

- Explorations in the Far North, 8°, 1898, 290 pp., (expeditions under the auspices of the University of Iowa, 1892-3-4).
 Human remains from the Trenton gravels. Am. Naturalist, 1899, 33.
 Studies in cranial variation. Am. Nat., 1900, 737-745.
 New instrument for measuring torsion. Am. Nat., 1901, No. 412.
 Laboratory outlines for use in somatology. Am. Anthropologist, 1901, v, 3.

CANADA

Before we turn again southward, a few words are due to Canada.

In 1862 Sir Daniel Wilson (1816-1892), Professor of History and English Literature in University College, Toronto, published two volumes on *Prehistoric Man*, the second of which is devoted largely to notes and measurements, many of them original with the author, on Mound, Peruvian, Mexican, and other American crania, including a nice series (39 male, 18 female) of those of the Hurons, besides a valuable series (39 skulls) of the Eskimo. To the description of the crania is added a chapter on "Racial Cranial Distortion," and other chapters on "The Indian of the West," "Intrusive Races," and "Migrations."

Besides his *Prehistoric Man*, which reached three editions, Sir Daniel Wilson published between 1853 and 1891 a series of articles dealing with various phases of anthropology and showing his strong and continued interest in the subject. These articles, a list of which follows, show that the subjects which mainly interested the author were craniology, early man, right and left handedness, and the Indians, together with one or two of the European races. There is much in these papers

that would deserve to be better known, though perhaps none of them reach the standard set at present for the professional anthropologist.

Remarks on the intrusion of the Germanic races on the area of the older Celtic races of Europe. *Canadian Journal*, 1853, II, 246.

Hints for the formation of a Canadian collection of crania. *Ibid.*, 1854-'5, III, 345-347.

Displacement and extinction among the primeval races of man. *Canad. J. Sci. Liter. & Hist.*, 1856-78, I, 4.

Discovery of Indian remains, County Norfolk, Can. West. *Ibid.*, 1856, I, 511-519. Indian remains. *Ibid.*, 554-556.

Supposed prevalence of one cranial type throughout the American aborigines. *Ibid.*, 1857, II, 406-435. Also *Edinb. New Philos. J.*, 1858, VII, 1-32.

Notice of a skull brought from the Crimea. *Ibid.*, V, 321-331.

Modifications affecting the ethnic significance of peculiar cranial forms. *Ibid.*, 1861, VI, 414-425. Also *Edinb. New Philos. J.*, 1861, XIV, 269-281.

Ethnical forms and undesigned artificial distortions of the human cranium. *Ibid.*, 1862, VII, 399-446; also rep., 8°, Toronto, 48 pp., 3 pl.

Physical Ethnology. *Smiths. Rep.*, Wash. 1863, 240-302.

Illustrations of the significance of certain ancient British skull forms. *Ibid.*, VIII, 127-157.

Physical characteristics of the ancient and modern Celt. *Ibid.*, IX, 369-405.

Race head forms and their expression by measurements. *Ibid.*, XII, 269-303.

The Huron race and its head form. *Ibid.*, 1871-73, XIII, 113-134; also *J. Anthrop. Inst.*, 1872, I, 262-263; also *Proc. & Trans. Roy. Soc. Can.*, II, 1884, 55-100.

Righthandedness. *Ibid.*, XIII, 193-231.

Hybridity and absorption of the Red Indian race. *Ibid.*, XIV, 432-466.

Brain weight and size in relation to relative capacity of races. *Ibid.*, 1876, XV, 177-230; also rep., Toronto, 56 pp.

Interglacial American man. *Ibid.*, XV, 557-573.

The Bohemian skull. *Proc. Canad. Inst.* (1879-1890), III, 43 (only a mention).

Primaeval dexterity. *Ibid.*, III, 125-143.

Anthropology. 8°, N. Y., 1885, 55 pp.

The right hand: lefthandedness. 12 mo., Lond. and N. Y., 1891, x, 215 pp.

Besides Daniel Wilson, Canada has produced two other men, now no more living, who deserve a special mention in this place. They were J. W. Dawson, the geologist and paleontologist, and David Boyle, the archeologist.

Professor Dawson (1820-1899), for many years principal of the McGill College and University, Montreal, became, in connection with his own work in paleontology and under the influence of Lyell's, Wilson's, and other publications on man's antiquity, seriously interested in this subject. He published several works relating more or less to anthropology, which were followed by his well-known *Fossil Men and their Modern Representatives* (London, 1880, i-viii, 1-348). It is interesting that in

this work, which naturally suffers from the imperfections of knowledge of its time, Sir Dawson shows himself quite skeptical as to any great antiquity of man in America: (p. 207) "The actual American race can make no monumental pretensions to a great antiquity, for its oldest remains, those of the ancient Alleghan nations, situated as they are on the modern alluvium of the western rivers, claim no greater antiquity than the similar mounds on the banks of the Tigris, and possibly are much less ancient. The only actual evidence of great age known in connection with them—that afforded by the growth of forest trees—would not carry them back farther than the earlier centuries of our era, and the decayed condition of the bones in the burial mounds is well known to be a criterion of very uncertain value "Thus our primitive American men seem to fall short in interest of those pre-historic races in Europe with which we have been comparing them, and which are by many believed to reach backward to a time enormously exceeding that to which any history, sacred or secular, extends."

Additional publications of Professor Dawson³⁷ which related more or less directly to physical anthropology, were as follows:

Review of "Darwin on the Origin of Species by means of Natural Selection."

Can. Nat. & Geol., Montreal, 1860, 5, no. 1, art. III, 100-120.

On the antiquity of man. A review of "Lyell" and "Wilson." Ibid., Montreal, 1863, 8 vo., VIII, 113-135. Also Edinburgh New Philos. J., 1864, N. S., XIX, 40-64.

On modern ideas of derivation. Can. Nat. & Quart. J. Sci., Montreal, July, 1869, N. S., IV, no. 2, 121-138.

The story of earth and man. London and Montreal, 1872, 12 mo., 420 pp. (9 editions).

Primitive man, etc. Trans. Victoria Institute, London, 1875, VIII, 59-63.

The dawn of life. Montreal, 1875, 239 pp. Also London, 1875, under title "Life's dawn on earth, etc.," 239 pp.

Origin and history of life on our planet. Montreal, 1875, 26 pp. Also Amer. Nat., 1875, IX, 529-552. Also Amer. Assoc. Adv. Sci., Proc. 1875, XXIV, pt. 2, 3-26.

Haeckel on the evolution of man. Princeton Rev., N. Y., 1880, V, 444-464.

The chain of life in geological time. Lond., 1880, 8 vo., I-XVI, 1-272. (Several subsequent editions.)

The antiquity of man and the origin of species. Kansas City Rev., K. C., 1881, 8 vo., IV, 530-536; 595-600.

Notes on pre-historic man in Egypt and the Lebanon. Lond., 1884, 8 vo., 1 pt., 15 pp., 3 pls. Also Edinburgh, Dublin, Paris, 1884, ditto. Discussion on same subject, Victoria Inst. Trans., 1885, XVIII, 9-12; 287-313.

³⁷ For portrait, biography and detailed bibliography of Sir John William Dawson, see Henry M. Ami, *Am. Geol.*, July, 1900, XXVI, 1-48.

Notes on aboriginal antiquities recently discovered in the island of Montreal.

Canad. Nat. & Geol., Montreal, 1860, v, 430-449.

Additional notes on aboriginal antiquities found at Montreal. Ibid., 1861, vi, 362-373.

David Boyle (1824-1909) was essentially an archeologist. His personal collections in this line, donated about 1876 to the Canadian Institute, became the nucleus of the present Provincial Archaeological Museum, at Toronto, of which ten years later he became curator and eventually director. He was not a somatologist, but his friendly attitude towards this branch of science is well seen in his detailed and well-illustrated "archaeological reports," published at first in connection with the Canadian Institute and later as appendices to the report of the Minister of Education for Ontario, many of which contain valuable notes on Indian ossuaries, other burials, on the collected skeletal material, and on other subjects of direct interest to physical anthropology.

Under the influence of Daniel Wilson's and Professor Dawson's activities, there were published in Canada between 1854 and 1890 a series of contributions relating more or less directly to physical anthropology and containing valuable information. A list of the more important of these articles is given underneath. They cover a wide variety of subjects; and it will be noticed that no more than two in any case are by the same author.³⁸

BELL (C. N.)—The mound builders in Canada. Proc. Canadian Institute, 1879-90, iv, 131-137.

BLEASDELL (WILLIAM)—The Indian tribes of Canada. Canadian Jour., 1852-55, iii, 209-210.

BOYLE (SUSANNA P.)—Cranial measurements. Archeol. Rep. Can. Inst., in Appendix to Rep. Minist. of Education, Toronto, 1892, 57-101.

BRYCE (REV. GEORGE)—The mound-builders (a lost race described). Trans. Hist. Soc. Winnipeg, 1884-85, 1-20.

CUMMING (W. H.)—On marriage and infanticide in China. Canad. J. Sci. Liter. & Hist., 1856-78, ix, 178-184.

DADE (REV. C.)—Indian remains. Canad. J., 1852-53, i, 6.

DARTNELL (G. H.)—Duration and expectation of life in Canada. Canad. J. 1852-55, ii, 191.

DAWSON (GEO. M.)—Sketch of the past and present condition of the Indians of Canada. Canad. Nat. & Geol., 1881, N. S., ix, 129-159.

— Notes on the Indian tribes of the Yukon District and adjacent northern portion of British Columbia. Repr. Ann. Rep. Geol. Survey. Canad., 1887, 1-23.

³⁸ Some of these authors are doubtless still among the living.

- DURAND (CHARLES)—Indian graves on the Humber. Note in "Toronto Globe," Jan. 15, 1887.
- HARVEY (ARTHUR)—Celtic, Roman and Greek types in France. *Trans. Canad. Instit.*, 1890, II, 176-208.
- HIRSCHELDER (C. A.)—Anthropological discoveries in Canada. *Proc. Canad. Inst.*, N. S., 1883, I, 354. Also "Toronto Mail," Dec. 2, 1882.
- The practical and theoretical study of anthropology. *Proc. Canad. Inst.*, N. S., 1883, I, 355. Also "Toronto Mail," Apr. 14, 1883.
- HUNTER (A. F.)—Villages and ossuaries of the Huron country. *Archaeol. Rep.*, *Canad. Instit.*, Toronto, 1888, 57-58.
- National characteristics and migrations of the Hurons as indicated by their remains in North Simcoe. Reports the cataloguing of 140 Huron-ossuaries. *Trans. Canad. Instit.*, 1891-92, III, 225-228.
- KANE (PAUL)—The Chinook Indians. *Canad. J. Sci. Liter. & Hist.*, 1856-78, II, 11-30.
- LANGTON (JOHN)—On the measurements of heads in ethnological investigation; *Trans. Lit. & Hist. Soc.*, Quebec, 1866.
- LEE (RICH.)—The native tribes of Polynesia. *Canad. J. Sci. Liter. & Hist.*, XII, 443-459.
- MATHEWS (PERCY W.)—Notes on diseases among the Indians frequenting York factory, Hudson Bay. Montreal, 1885.
- MCLEAN, (REV. JOHN)—Mortuary customs of the Blackfeet Indians. *Proc. Canad. Instit.*, 1879-90, V, 20-24.
- MATTHEWS (DR. PERCY W. P.)—Early development of aboriginal women. *Ibid.*, IV, 181-186.
- PAYNE (F. F.)—The Eskimo of Hudson's Strait. *Ibid.*, VI, 26; 213-230.
- PREST (W. H.)—Measurements of Beothuk skulls. *Trans. Nova Scot. Inst. Nat. Sci.*, 1894-95, IX, p. LXXXVIII et seq.
- SCHULTZ (DR. M. P.)—The mound builders of the West. *Canad. Nat. & Geol.*, etc., 1881, IX, 60-62.
- STUPART, (R. F.)—Eskimo of Stupart Bay. *Proc. Canad. Instit.*, 1879-90, V, 20-24.
- TUCKER (DAVID)—On secluded tribes of uncivilized men. *Canad. J. Sci. Liter. & Hist.*, 1856-78, IX, 326-343.
- VAN COURTLAND (EDWARD)—Notice of an Indian burying ground. *Canad. J.*, 1852-53, I, 160-161.
- WILSON (CAPTAIN)—Report on the Indian tribes inhabiting the country in the vicinity of the 49th parallel of N. Latitude. *J. Ethnol. Soc. London*, 1865, IV, 275-332.

A very important organized step in the line of anthropological research in Canada was initiated in the early eighties by the appointment, under the auspices of the British Association for Advancement of Science, of a Committee, consisting of Dr. E. B. Tylor, Dr. G. M. Dawson, General Sir J. H. Lefroy, Dr. Daniel Wilson, Mr. R. G. Haliburton, and Mr. George W. Bloxam (Secretary), for the purpose of investigating and publishing reports on the physical characters, languages,

and industrial and social condition of the Northwestern tribes of the Dominion of Canada. As, however, the somatological work accomplished under this Committee belongs in the main to authors who are still among the living, the subject will be dealt with most appropriately in the final section of the memoir.

MIDDLE ATLANTIC STATES

Proceeding again southward from Boston and Toronto we find that, in New York, the old Ethnological Society had gone out of existence. A number of medical collections, including anthropological specimens, were being formed in connection with several of the hospitals and colleges, but resulted in nothing of importance to our science. The American Museum of Natural History was not established until 1869, and had not seriously begun its valuable collections or research in physical anthropology until after the advent of Putnam, well toward the end of the century.

West of New York, several collections of Indian crania were begun in the earlier part of the second half of the nineteenth century, particularly in Chicago, where also appeared, between 1867 and 1873, a number of publications touching on the physical anthropology of the American race by J. W. Foster, the geologist (1815-1873).³⁹ Unfortunately none of these publications, so far as they dealt with somatology, were of much value.

In coming back to Philadelphia, we see that the old Wistar and Horner Museum (founded 1808) has been enriched by anthropological material;⁴⁰ and there are rising from the medical ranks which have already given us Morton, Meigs, and Leidy in that city, two new men who, particularly in one case, were to become of considerable importance to physical anthropology. They are Dr. Harrison Allen (1841-'97), and Dr. Daniel G. Brinton (1847-'99).

Dr. Harrison Allen was born in Philadelphia in 1841. Like Morton he was deprived, by untoward circumstances, of preliminary higher education. In a large measure self-taught, he matriculated in 1859 in the

³⁹ On the Antiquity of Man in North America, *Trans, Acad. Sci.*, I, Chicago, 1867-69, 227-257. On Certain Peculiarities in the Crania of the Mound-Builders, *Proc. Am. Asso. Adv. Sci.*, 1872, XXI, 227-255; *American Naturalist*, 1872, VI, 738-747. *Prehistoric Races of the United States of America*, 8°, Chicago, 1873, xv, 415.

⁴⁰ Destined eventually to become a part of the collections of the Wistar Institute of Anatomy and Biology, incorporated in 1892.

medical department of the University of Pennsylvania and was graduated in 1861. From the latter date to 1865 he served as physician or surgeon in various city and army hospitals at Philadelphia and about Washington. At the close of 1865, resigning from the army service, he returned to Philadelphia to attend on the one hand to practice, and on the other to engage in anatomical, anthropological, and biological investigation. Soon after he was offered the position of Professor of Zoölogy and Comparative Anatomy in the auxiliary Faculty of Medicine at the University of Pennsylvania,⁴¹ which he held for many years. Later he was also for a time Professor of Institutes (mainly physiology) at the University; the chair of anatomy was occupied by Leidy. In 1892 he was elected President of the Association of American Anatomists, and shortly after became the first Director of the Wistar Institute.

Judging from his anthropological writings, Harrison Allen became interested in this branch of science primarily through the works of Morton and J. Aitken Meigs, the latter of whom he knew personally; in large measure, however, he also followed the more modern English craniologists.

The number of his anthropological contributions is large, as will be seen from the appended list; but in many instances, it is to be regretted, the title covers merely a note on a more or less extended oral communication, the publication of which in full was not accomplished.

Allen's three most important contributions to physical anthropology are *The Clinical Study of the Skull* (1890); *The Crania from the Mounds of the St. John's River, Florida* (1896); and *The Study of Hawaiian Skulls* (1898, finished just before his death). These works are accompanied by excellent illustrations; the measurements and special observations are much more detailed than in any previous American work; the whole treatment of the subjects shows much erudition; and the works compare favorably with any anthropological memoirs published to that date abroad.

The Clinical Study of the Skull was the tenth of the Toner Lectures of the Smithsonian Institution—lectures "instituted to encourage the discovery of new truths for the advancement of medicine." It was delivered May 29th, 1889, and printed a year later. Notwithstanding its medical title, it is strictly an anthropological publication, which deals

⁴¹ *Memoir of Harrison Allen, M.D.*, by Horatio C. Wood., M.D.; read April 6, 1898; 8°, Phila. 1898, 1-15. This memoir, as well as the bibliography it contains, are, however, defective.

with many features and anomalies of racial skulls that had scarcely been noticed up to that time, as will be apparent from the following subdivisions of the essay: 1, The malar bone; 2, the lower jaw; 3, the norma basilaris; 4, the basi-cranial angle; 5, the posterula; 6, the nasal chambers; 7, the vertex—its sutures, eminences, depressions, general shape, etc.; 8, sutures other than those of the vertex; 9, the foramina; 10, the grooves caused by blood-vessels; and 11, the cranial ridges, processes, etc.

The memoir on *Crania from the Mounds of the St. John's River*, calls attention for the first time to the highly deserving series of archeological explorations, and their accompanying anthropological collections, carried on to this day by Mr. Clarence B. Moore. Comparative measurements and observations are given on a considerable number of other American skulls from Alaska to California. The results of several interesting new measurements are shown; and included are reports on complete and incomplete divisions of the malar bone, on various features of the condyloid process of the lower jaw, on senile absorption, and on numerous interesting morphological characteristics of the teeth.

The final larger anthropological contribution of Harrison Allen, that on Hawaiian skulls, is really a modern production, which gives valuable detailed measurements; shows a novel method of graphic representation of the numerical data and of contrast of series; and, like the works previously mentioned, includes many interesting collateral observations, such as those on prenasal fossæ, the lower jaw, the infra-orbital suture, the hard palate, the teeth and their effect on skull form, the premature closure of sutures, and various pathological conditions.

Besides the above, there are a number of articles by Harrison Allen the true contents of which are more or less obscured, or imperfectly expressed by their titles, and which are of considerable interest to the anthropologist. They are "The Jaw of Moulin Quignon" (1867); "Localization of Diseased Action in the Osseous System" (1870); "On Certain Peculiarities in the Construction of the Orbit" (1870); "On the Methods of Study of the Crowns of the Human Teeth" (1888); and "On the Effects of Disease and Senility in the Bones and Teeth of Mammals."

Considering the excellence of Harrison Allen's contributions to anthropology and the plain fact that he, after Morton and Wyman, stands as the foremost American representative of our branch of science before the end of the nineteenth century, it might seem strange that his influence on the development of the science remained only moderate.

The explanation of this lies doubtless in the fact that he did not devote himself exclusively to physical anthropology, but by many was regarded essentially as a biologist or anatomist; and that except for the few years before his death, when he held the directorship of the Wistar Institute, he was not connected in a higher capacity with any museum or institution, and made no noteworthy collections. Also he never engaged in the teaching of anthropology; and his publications in this line, while altogether of a respectable number and volume, were nevertheless, when taken individually, often far apart, disconnected, and mostly quite brief. A list of his writings follows:

- [The Third Condyle in Man.] Proc. Acad. Nat. Sci. Phila., 1867, 137.
- The Jaw of Moulin Quignon. Dental Cosmos, Phila., 1867, ix, 169-180.
- On the inter-orbital space in the human skull. Proc. Acad. Nat. Sci. Phila., 1869, Biol. 13.
- Localization of diseased action in the osseous system. Am. Jour. Med. Sci., 1870, 401-409.
- On certain peculiarities in the construction of the orbit. Am. Jour. Med. Sci., Phila., 1870, N. S., LXIX, 116-119.
- Life-form in art. 4°, Phila., 1875, 70 pp.
- On the effect of the bipedal position in man. Proc. Acad. Nat. Sci. Phila., 1875, 468-469.
- Autopsy of the Siamese Twins. Trans. Coll. Physicians Phila., Phila., 1875, VIII, 21-42.
- A human skull exhibiting unusual features. Proc. Acad. Nat. Sci. Phila., 1876, 17-18 (Pterygo-sphenoid process).
- Distinctive characters of teeth. Proc. Acad. Nat. Sci. Phila., 1878, 39; note.
- Asymmetry of the turbinated bones in man. Proc. Acad. Nat. Sci. Phila., 1882, 239-240.
- Irregularities of the dental arch. Proc. Acad. Nat. Sci. Phila., 1882, 310.
- Asymmetry of the nasal chambers without septal deviation. Arch. of Laryngol., 1883, iv, 256-257.
- On the methods of study of the crowns of the human teeth, including their variations. Dental Cosmos, Phila., xxx, 1888, 376-379.
- On hyperostosis of the premaxillary portion of the nasal septum, etc. Medical News, Phila., 1890, LVII, 183-186.
- The influence exerted by the tongue on the positions of the teeth. Proc. Acad. Nat. Sci. Phila., 1891, 451.
- On the bipartite malar in the American Indian. Proc. Asso. Am. Anatomists for 1888-1890, Wash., 1891, 16.
- The forms of edentulous jaws in the human subject. Proc. Acad. Nat. Sci. Phila., 1893, 11-13.
- Congenital defects of the face. N Y. Med. Jour., 1893, LVIII, 759-760.
- Hyperostosis on the inner side of the human lower jaw. Proc. Acad. Nat. Sci. Phila., 1894, 182-183.
- The changes which take place in the skull coincident with shortening of the face-axis. Proc. Acad. Nat. Sci. Phila., 1894, 181-182.

- Pithecanthropus erectus. Science, 1895, N. S., I, 239-240, 299.
 The classification of skulls. Science, 1895, N. S., I, 381.
 Demonstration of skulls showing the effects of cretinism on the shape of the nasal chambers. N. Y. Med. Jour. 1895, LXI, 139-140.
 Note on a uniform plan of describing the human skull. Proc. Asso. Am. Anat., 8th session, 1895, 65-68; also in Proc. Acad. Nat. Sci. Phila., 1896, 170-174.
 On the effects of disease and senility as illustrated in the bones and teeth of mammals. Science, 1897, N. S., V, 289-294. German translation in *Rundschau*.
 Study of skulls from the Hawaiian islands. With an introduction by D. G. Brinton. Wagner Institute. Proc. Acad. Nat. Sci. Phila., 1898, V, 1-55, 12 plates.

The second student mentioned at the beginning of this section was Daniel G. Brinton. Of widely different personality from that of Harrison Allen, his services to physical anthropology were also of quite a different character.

Doctor Brinton was graduated from Yale, received his medical degree in 1860 at the Jefferson Medical College in Philadelphia, and traveled in Europe. He served through the Civil War in his medical capacity, but toward the end of 1865 returned to West Chester and thence to Philadelphia, where he practiced medicine and became editor of *The Medical and Surgical Reporter*, position he held until 1887.⁴² Eventually he became Professor of Ethnology and Archeology in the Academy of Natural Sciences of Philadelphia, Professor of American Linguistics and Archeology in the University of Pennsylvania, and Curator of the American Philosophical Society collections.

Brinton's interest in anthropology dated probably from his boyhood, and extended to all branches of the science, including somatology. Like Harrison Allen, he came but little in direct contact with the American tribes, in whom nevertheless all his interests centered; but unlike Allen he was much more a student than a laboratory man or a practical anatomist. Allen and Brinton associated, however, as friends, and each doubtless exercised an influence on the other's thought and scientific production.

Among the numerous publications of Brinton relating to anthropological subjects, more than thirty are of more or less direct interest to physical anthropology (see appended bibliography). Of these the large majority are of a documentary or general nature, the more noteworthy being *The Floridian Peninsula* (1859); *The Mound-builders* (1881);

⁴² For further details see *Report of the Brinton Memorial meeting*, 8°, Phila., 1900, 67 pp.

Races and Peoples (1890); and *The American Race* (1891). Among his special articles, those deserving more particular notice here are that on "Anthropology, as a Science and as a Branch of University Education in the United States" (1892); "On Certain Indian Skulls from Burial Mounds in Missouri" (1892); "On the Variations of the Human Skeleton and their Causes" (1894); "On the Aims of Anthropology" (1895); and "On the Factors of Heredity and Environment" (1898).

In glancing over these publications the student of physical anthropology will find many useful data and much that is helpful; but here and there he will also come across a bowlder in the path which it will be necessary to remove and the traces of which in some cases will long yet be perceptible. Among the most helpful were Brinton's articles on the mound-builders, counteracting the old prevalent opinion that there had existed a separate mound-builder race distinct from the rest of the Indians. Among his opinions which it would be hard to accept today were that the Eskimo extended far to the south of their present eastern abode; the probability of the derivation of the American race at the close of the last glacial epoch from Europe; and his correspondingly antagonistic attitude toward the theory of Asiatic derivation of the Indians.

Doctor Brinton excelled as a critic and in discussion; and notwithstanding a lack of sufficient specialization in physical anthropology, his activities exercised a favorable influence on the progress of the science in common with other branches of anthropology. Dr. Brinton's bibliography relating more or less to somatology follows:

- The Floridian peninsula, its literary history, Indian tribes and antiquities. 8°, Philadelphia, 1859.
- The Shawnees and their migrations. *Historical Magazine*, Jan. 1866 (Morrisania, New York), x, 1-4.
- The Mound-builders of the Mississippi valley. *Historical Magazine*, Feb., 1866, xi, 33-37.
- The probable nationality of the mound-builders. *American Antiquarian*, Oct., 1881, iv, 9-18.
- Anthropology and ethnology. *Iconographic Encyclopedia*, Phila., 1886, i, 1-184.
- A review of the data for the study of the prehistoric chronology of America. *Proc. Amer. Assoc. for the Advancement of Science*, 1887, Sep. 26 pp.
- On an ancient human footprint from Nicaragua. *Proc. Amer. Philos. Soc.*, Nov., 1887, xxiv, 437-444.
- On a limonite human vertebra from Florida. *Proc. Amer. Assoc. Adv. Sci.*, 1888, xxvii.
- On the alleged Mongoloid affinities of the American race. *Proc. Amer. Assoc. Adv. Sci.*, 1888, xxvii, 325.

- The cradle of the Semites. A paper read before the Philadelphia Oriental Club. Phila., 1890, 26 pp.
- Races and peoples; Lectures on the science of ethnography. 12°, N. Y., 1890, 313 pp., 5 maps.
- Essays of an Americanist. I, Ethnologic and Archæologic. Illus., 8°, Phila., 1890.
- Folk-lore of the bones. Jour. Amer. Folk-lore, Jan. 1890, III, 17-22.
- The American race: A linguistic classification and the ethnographic description of the native tribes of North and South America. New York, 1891, 392 pp.
- Current notes on anthropology. Science, New York, 1892.
- Anthropology as a science and as a branch of university education in the United States. Phila., 1892, 15 pp.
- The nomenclature and teaching of anthropology. American Anthropologist, July, 1892, v, 263-271.
- Remarks on certain Indian skulls from burial mounds in Missouri, Illinois and Wisconsin. Trans. Coll. Physicians, Phila., Nov., 1892, third series, xiv, 217-219.
- European origin of the white race. Science, June, 1892, xix, 360.
- Proposed classification and international nomenclature of the anthropologic sciences. Proc. Amer. Assoc. Adv. Sci., 1892, xli, 257-258.
- The African race in America. Chambers' Cyclopedia, new edition, London and Phila., 1893, vii, 428-430. Article "Negroes."
- The beginnings of man and the age of the race. The Forum, December, 1893, xvi, 452-458.
- Variations of the human skeleton and their causes. Amer. Anthropologist, Oct., 1894, vii, 377-386.
- On various supposed relations between the American and Asian races. Mem. Internat. Congr. Anthropol., Chicago, 1894, 145-151.
- The "nation" as an element in anthropology. Mem. Internat. Congr. Anthropol., Chicago, 1894, 19-34.
- The aims of anthropology. Proc. Amer. Assoc. Adv. Sci., 1895, xlv, 1-17.
- Left-handedness in North American aboriginal art. Amer. Anthropologist, May, 1896, ix, 175-181.
- The relations of race and culture to degenerations of the reproductive organs and functions in women. Medical News, N. Y., Jan. 18, 1896, 68-69.
- On the remains of foreigners discovered in Egypt by Mr. Flinders Petrie, 1895. Proc. Amer. Philosophical Soc., Jan., 1896, xxxv, 63-64.
- Dr. Allen's contributions to anthropology. Proc. Acad. Nat. Sci. Phila., December, 1897, 522-529.
- The factors of heredity and environment in man. Amer. Anthropologist, Sept., 1898, xi, 271-277.
- The dwarf tribe of the upper Amazon. Amer. Anthropologist, Sept., 1898, xi, 277-279.
- The Peoples of the Philippines. Amer. Anthropologist, Oct., 1898, 293-307.

HISTORY OF ANTHROPOLOGY IN WASHINGTON

Again leaving Philadelphia, further tracing of the earlier history of physical anthropology in the English speaking countries of this continent leads us to Washington, to the various Government exploring expeditions, to certain corporate bodies associated with the United States Government, and finally to Government institutions proper.

The earliest event of importance to physical anthropology in Washington of which any records exist, was the gathering of Indian and other crania made by the United States Exploring Expedition of 1838-1842. No concrete record seems to exist showing exactly what this collection comprised. It was deposited with the National Institute (1840-1862), a society with a strong Government affiliation. In 1841 this society was granted the use of quarters in the Patent Office building for its collections, and collections belonging to the Government were confined to its care. In the latter, we are told, natural history and ethnology predominated.⁴³ According to a catalogue of the collections of the National Institute, by Alfred Hunter (second edition, 1855), the anthropological material in the Institute at that time comprised an "Ancient skull;" "a very superior collection of human crania, many of them collected by the United States Exploring Expedition from the Pacific Islands;" "a skull from the Columbia river;" "skull of a Chenook Chief;" four skulls "from an ancient cemetery;" a "mummy from Oregon;" "two tattooed heads from Fiji;" "Peruvian mummies;" "two Egyptian mummies;" "the skull and paws of a chimpanzee;" and numerous busts in plaster of distinguished persons. These collections remained in the Patent Office in part until 1858 and in part until 1862, when they were transferred to the Smithsonian Institution.

The Smithsonian Institution was established in 1846, under the terms of the will of James Smithson, who in 1826 bequeathed his fortune to the United States for the "increase and diffusion of knowledge among men."⁴⁴ From the income of the fund the present Smithsonian building was erected on land given by the United States, and on its completion in 1858 a large part of the collections assembled under the auspices of the Government up to that time were assigned to the custody of

⁴³ See Richard Rathbun: *The National Gallery of Art, Bull. 70, U. S. National Museum, Wash., 1909, p. 25 et seq.*

⁴⁴ *The Smithsonian Institution, at Washington, etc., Washington, 1907, also, The Smithsonian Institution; documents relative to its origin and history, by Wm. J. Rhees, Washington, 1879, 1027 pp.*

the Institution. The National Institute passed out of existence in 1862.

In 1863 the Smithsonian Institution collections were partly destroyed by fire,⁴⁵ but the anthropological part fortunately escaped.

In 1862 another establishment was founded in Washington which was destined to render a great service to physical anthropology. This was the Army Medical Museum. Almost from the first cooperative relations were established with the Smithsonian Institution, involving in the course of time extensive exchange of specimens; and on January 16, 1869, a formal arrangement was entered into between Secretary Henry, for the Smithsonian Institution, and Dr. George A. Otis, curator of the Army Medical Museum, for the transfer thenceforth from that Museum to the Smithsonian Institution of all ethnological and archeological articles that were then in the Medical Museum or might be received in the future, in return for which the Museum received and was to receive thenceforth all human skeletal material. The actual number of crania then transferred does not appear in the records, but the collection must already have been of some importance; and in the following years hundreds of specimens of similar nature were received by the Museum from the Smithsonian. In addition, letters and circulars were sent out by Doctor Otis to Army and Navy surgeons as well as to other persons, and through this medium the Army Medical Museum anthropological collections grew until, in 1873, they included approximately sixteen hundred crania of American aborigines and other races.⁴⁶

About 1870, or shortly after, a series of measurements were undertaken on the crania in the Army Medical Museum collection under Doctor Otis's direction; and in 1876 and again in 1880 a "Check-List" was published by Doctor Otis, the later edition including records on more than two thousand human crania and skeletons from many parts of the world. Unfortunately the majority of the measurements were made by an unscientific employee and with instruments less perfect than those now in anthropometric use, with the consequence that many of the determinations have since been found by remeasurement of the specimens to be more or less inaccurate, and the catalogue on that account can not be used with any degree of confidence.

After Doctor Otis's death in 1881 the anthropological studies suffered a temporary set-back, but were stimulated again in 1884 when Dr. J.

⁴⁵ See *Annual Report of the Smithsonian Institution*, 1864, p. 117, et seq.

⁴⁶ For an account of the services of the Army Medical Museum to American anthropology, see Dr. D. S. Lamb, *Trans. xix Intern. Congr. Americanists*, Wash., 1917, 625-632.

S. Billings, U. S. Army, became Curator of the Museum. As a result of Doctor Billings' interest in anthropological work it was taken up by another United States Army surgeon, namely Dr. Washington Matthews.

Before this, however, two important publications of direct interest to physical anthropology were made possible by investigations conducted in connection with the United States Army. The first was Dr. B. A. Gould's, *The Military and Anthropological Statistics of the War of the Rebellion*, 8°, New York, 1865; the second being the *Statistics, Medical and Anthropological, of the Provost-marshal-general's Bureau*, two volumes, 4°, 1875, by J. H. Baxter.

Both of these works deal with statistical data and observations obtained on Northern recruits during the Civil War, and represent the first efforts of note on this continent in anthropology of the living, the records extending to many thousands of subjects. The data were secured by medical examiners and other physicians. Unfortunately the work was carried out under unfavorable circumstances and by men many of whom had no previous knowledge of these matters, and who received no instruction except by circulars. The records in consequence, while interesting, can not be regarded as sufficiently reliable for the present demands of anthropology. In a number of instances, as in the reports on certain physiological observations on the "Indians" enlisted in the army, the results, in view of our subsequent information on these subjects, are so inaccurate as to be quite useless.

Dr. Washington Matthews (1843-1905), to whom we may now return, while becoming known to science mainly for his contributions to the Hidatsa and Navaho ethnology, was nevertheless interested considerably and effectively in physical anthropology. In the Army Medical Museum, with which he became connected about 1884, and in part with Doctor Billings, he carried on and published the results of investigations on the measurement of the cranial capacity, on composite photography and appliances for the same, on several modifications of anthropometric instruments, and on anatomical and anthropological characteristics of Indian crania, particularly those of the ancient Pueblos collected by the Hemenway Expedition.

The Hemenway Expedition was fitted out in 1886 under the direction of Frank Hamilton Cushing, with funds supplied by Mrs. Mary Hemenway of Boston, for exploring certain ruins of the Gila drainage in Arizona. While the work was fairly under way, Dr. J. L. Wortman, at that time anatomist of the Army Medical Museum, visited the excavations in the Salt River valley at the instance of Mr. Cushing and Dr.

Matthews, and obtained a large collection of the fragile skeletal remains of the ancient Pueblos, which was forwarded to the Museum. Here they were eventually studied by Matthews and Wortman and the results were published in a quarto memoir,⁴⁷ which forms a contribution of lasting value to physical anthropology and a worthy companion to Allen's *Crania of the St. John's River*.

Doctor Matthews, a personal friend of the writer, was interested in physical anthropology to the close of his life; but advancing illness obliged him for several years before his death to give up active work in this direction. Shortly before his death he was instrumental in the final stage of retransfer of the anthropological collections from the Army Medical Museum to the Smithsonian Institution;⁴⁸ and he left hundreds of drawings and records on parts of these collections. Doctor Matthews' contributions to physical anthropology were as follows:⁴⁹

The curvature of the skull. Trans. Anthr. Soc. Wash., Wash., 1885, III, 171-172. On composite photography as applied to craniology, by J. S. Billings; and on measuring the cubic capacity of skulls, by Washington Matthews. Read April 22, 1885. Mem. Nat. Acad. Sci., Wash., 1886, III, pt. 2, 13th mem., pp. 103-116, 19 pl.

On a new craniophore for use in making composite photographs of skulls, by John S. Billings and Washington Matthews. Read Nov. 12, 1885. Mem. Nat. Acad. Sci., Wash., 1886, III, pt. 2, 14th mem., pp. 117-119, 4 pls.

Apparatus for tracing orthogonal projections of the skull in the U. S. Army Medical Museum. J. Anat. and Physiol., Edinb., 1886, XXI, 43-45, 1 pl.

An apparatus for determining the angle of torsion of the humerus. J. Anat. and Physiol., Edinb., 1886, XXI, 43-45, 1 pl.

The study of consumption among the Indians. N. Y. Med. Jour., July 30, 1887.

A further contribution to the study of consumption among the Indians. Trans. Am. Climatol. Assoc., Washington meeting, Phila., 1888, 136-155.

The Inca bone and kindred formations among the ancient Arizonians. Am. Anthropologist, Wash., 1889, II, 337-345.

Human bones of the Hemenway collection in the U. S. Army Medical Museum. Mem. Nat. Acad. Sci., Wash., 1893, VI, 7th mem., pp. 139-286, 57 pl.

Use of rubber bags in gauging cranial capacity. Am. Anthropologist, 1898, XI, 171-176.

⁴⁷ The Human Bones of the Hemenway collection in the U. S. Army Medical Museum at Washington, by Dr. Washington Matthews, surgeon U. S. Army, "with observations on the Hyoid bones of this collection, by Dr. J. L. Wortman, *Seventh Memoir of the National Academy of Sciences*, Washington, 1891, pp. 141-286, plates 1-59.

⁴⁸ See under Smithsonian Institution.

⁴⁹ For other publications and a biographical sketch, see Mooney, J., in *American Anthropologist*, 1905, N. S., VII, no. 3, 514-523.

We may now return to the Smithsonian Institution. While conditions during a larger part of the second half of the 19th century were not propitious for active participation by the Institution in anthropological research, nevertheless its publications, as will be seen from the bibliography, included many anthropological contributions by writers both foreign and American.

In 1872 Professor Otis T. Mason became connected with the Institution as collaborator in ethnology.

In 1879, the collections of the Institution increasing, Congress authorized the erection of a separate building for the National Museum, which was completed in 1881. In 1884 Professor Mason became curator of the Department of Ethnology in the Museum, and for almost a quarter of a century was active in this position with most creditable results.⁵⁰

While above all an ethnologist (in the American sense of the word), and while from a deep religious sentiment rather averse to the doctrine of man's evolution, Professor Mason was nevertheless one of the warmest friends of physical anthropology; and his helpful hand was in no small measure responsible for the subsequent auspicious development of the Division of Physical Anthropology in the U. S. National Museum.

But somatology benefited also directly from Professor Mason's scientific contributions. After Squier⁵¹ and Fletcher⁵² he described one of the earliest known examples of Peruvian trephining;⁵³ he had printed for distribution the best contemporaneous classification of the human races; and several of his papers,⁵⁴ with his very useful annual contributions to anthropological bibliography, were of real service to our science. He was one of the founders (1879) and for a long time one of the most active members of the Anthropological Society of Washington;

⁵⁰ See Otis Tufton Mason, by A. Hrdlička, *Science*, 1908, xxviii, 746-748; and by Walter Hough, *American Anthropologist*, 1908, x, 661-667.

⁵¹ Squier, (E. George) *Peru*, 8°, N. Y., 1877.

⁵² Fletcher, On prehistoric trephining and cranial amulets. *Contributions to N. A. Ethnology*, vol. v, Wash., 1882.

⁵³ The Chacacayo trephined skull; with measurements by Dr. Irwin C. Rosse, U. S. A., *Proc. U. S. National Museum*, 1885, 410-412, pl. 22, and list of measurements (appended).

⁵⁴ *What is Anthropology?* A Saturday lecture delivered in the U. S. National Museum, March, 1882, 21 pp. The scope and value of anthropological studies, *Proc. A. A. A. S.* 1884, 365-383. The relation of the mound builders to the historic Indians, *Science*, 1884, iii, 658-659. Indians in the U. S., June 30, 1886, *Rep. U. S. Nat. Mus.*, 1885, 902-907. Migration and the food quest: A study in the peopling of America, *Smithsonian Rep.*, 1894, 523-539, map.

and his beneficial, stimulating effect on all branches of anthropology was felt at many a meeting of Section H of the American Association.

Among other friends of anthropology in connection with the Smithsonian Institution, now deceased, it is necessary to mention Dr. J. M. Toner and Thomas Wilson.

By the generous endowment of Doctor Toner there were delivered under the auspices of the Institution, between 1873 and 1889, a series of lectures on medical and related topics which included two of special interest to physical anthropology, namely, "The Dual Character of the Brain," by Dr. C. E. Brown-Séquard,⁵⁵ and "The Clinical Study of the Skull," already mentioned, by Dr. Harrison Allen. Doctor Toner was also one of the founders of the Anthropological Society of Washington.

Thomas Wilson (1832-1902), previously for several years United States Consul to Ghent, Nantes, and Nice, became attached to the National Museum in 1887 as curator of the Division of Prehistoric Anthropology.⁵⁶ While abroad, and particularly in France, he became deeply interested in archeological matters and especially in the remains of early man, subjects which occupied his attention throughout the period of his connection with the Museum. Collaterally he was, however, interested in physical anthropology, and a number of his papers deal with matters relating to that science. It is to be regretted that they were not specific enough to be of lasting value.

His publications of interest to physical anthropology are: "A study of prehistoric anthropology" (*Annual Report U. S. National Museum*, 1888); "Man in North America during the Paleolithic period" (*ibid.*); "Anthropology at the Paris Exposition" (*ibid.*, 1890); and "The Antiquity of the red race in America" (*ibid.*, 1895).

By 1897 the collections of the United States National Museum had grown to such an extent that a new plan of organization of its departments became necessary. By this plan three large departments were established—Anthropology (in the broader sense of the term), Biology, and Geology; and Professor W. H. Holmes was appointed head curator of the Department of Anthropology, which was subdivided into eight sections.⁵⁷ Prof. O. T. Mason remained as curator of ethnology, later serving for several years as acting head curator.

⁵⁵ Delivered Apr. 22, 1874, published in *Smithsonian Misc. Coll.*, Jan., 1877.

⁵⁶ See in Memoriam: Thomas Wilson, by O. T. Mason, *American Anthropologist*, 1v, April-June, 1902.

⁵⁷ See *Report U. S. National Museum for 1897*, Washington, 1899, p. 6, et seq.

It was Prof. W. H. Holmes, fortunately still living and active, who saw the need of and eventually succeeded in adding to his department, the Division of Physical Anthropology, the first regular division devoted entirely to this branch of science on this continent. With this end in view an arrangement was made with the overcrowded Army Medical Museum, whereby a larger part of the normal somatological material in that institution (approximately two thousand crania) was transferred to the National Museum in 1898–1899. The division came into actual existence in 1903, in charge of the writer; in 1904 another highly valuable instalment of anthropological material (approximately fifteen hundred crania and skeletons) was transferred to the division from the Army Medical Museum, the latter retaining only specimens of pathological or surgical interest; and subsequently, by coöperation with other institutions and through the help of many friends of the Smithsonian, as well as through field exploration and laboratory work, the collections have increased until today they consist of 10,000 racial crania and skeletons, 1500 human and animal brains, and thousands of photographs, casts, and other objects relating to physical anthropology.

In touching on the development of the Division of Physical Anthropology in the National Museum, we have passed by a collateral event of much importance, namely the establishment, in connection with the Smithsonian Institution, of the Bureau of American Ethnology.

The Bureau of American Ethnology was definitely organized in 1879, and placed by Congress under the supervision of the Smithsonian Institution.⁵⁸ Several years before this, however, Major Powell, as Director of the Geographical and Geological Survey of the Rocky Mountain Region, began the publication of a series of important volumes called *Contributions to North American Ethnology*, and it was the preparation of these which may really be looked upon as the beginning of the Bureau's existence. Major Powell himself had accomplished important work among the tribes of the Rio Colorado drainage in connection with his geological and geographical researches, and he logically became the first director of the Bureau when separately established.

The Bureau of American Ethnology has not directly occupied itself with somatology; but from the beginning of the important explorations carried on under its auspices collection of skeletal remains of the American Indians was encouraged, and an important part of the present collections in physical anthropology in the U. S. National Museum, pro-

⁵⁸ *Handbook of American Indians North of Mexico*, Washington, 1912, I (4th impression), p. 171 et seq.

ceed from such field work. Besides this the publications of the Bureau were from the first open to our branch of science, with the result that at this time they contain a respectable number of more or less direct contributions in this line; and on the whole it may be said that physical anthropology in this country derived much encouragement from this most deserving institution.

Among the members of the Bureau, not now living, several deserve special mention for their services to our branch of science. These are J. C. Pilling, whose bibliographies are of assistance; Dr. W. J. Hoffman, who was interested directly in somatology, reporting, among other writings, on "The Chaco Cranium"⁵⁹ and on the Menomoni Indians;⁶⁰ Cyrus Thomas, who during his exploration of the mounds collected many crania now part of our collections; and W. J. McGee, who contributed to our knowledge of the Sioux and Seri Indians, and gave us, with Muñiz, an excellent memoir on Primitive Trephining in Peru.⁶¹

Papers published by the Smithsonian Institution and its branches relating more or less directly to physical anthropology, and excluding those of living authors, are the following.⁶²

1851. Culbertson, T. A. Indian tribes of the upper Missouri. S.R., v.
1852. Stanley, J. M. Catalogue of portraits of North American Indians, and sketches of scenery, etc. S.R., vi.
1855. Letterman, J. Sketch of the Navajo Indians. S.R., x.
1856. Haven, Samuel F. Archeology of the U. S., or Sketches, Historical and Bibliographical, of the Progress of information and opinion respecting vestiges of antiquity in the United States. S.R., viii.
1859. Retzius, A. Present state of ethnology in relation to the form of the human skull. S.R.
1860. Morgan, Lewis H. Circular in reference to the degrees of relationship among different nations. S.M., ii.
1861. Morgan, L. H. Suggestions relative to an ethnological map of North America.

⁵⁹ *Tenth Ann. Report of the U. S. Geol. and Geogr. Survey, of the Terr. for 1876*, Wash., 1878, 453-457, 2 pl.

⁶⁰ *Fourteenth Ann. Report Bureau Amer. Ethnology*.

⁶¹ The Seri Indians, *17th Ann. Rep. B. A. E.* With M. A. Muñiz, Primitive Trephining in Peru, *16th Ann. Report, B. A. E.*

⁶² Abbreviations: S.R., Annual Report of the Smithsonian Institution; S.C., Smithsonian Contributions to Knowledge; S. M., Smithsonian Miscellaneous Collections; P. N. M., Proceedings United States National Museum; B. N. M., Bulletin United States National Museum; R. N. M., Annual Report United States National Museum; C. E., Contributions to North American Ethnology; R. B. E., Annual Report Bureau American Ethnology; B. B. E., Bulletin Bureau American Ethnology.

1862. Stanley, J. M. Catalogue of portraits of North American Indians. S.M.
II.
1862. Reid, A. Skulls and mummy from Patagonia. S.R.
1862. Gibbs, G. Ethnological map of the United States. S.R.
1862. Wilson, D. Lectures on physical ethnology. S.R.
1862. Morlot, A. Lecture on the study of high antiquity. S.R.
1862. Quatrefages, A. de. Memoir of Isidore Geoffrey St. Hilaire. S.R.
1862. Reid, A. Human remains from Patagonia. S.R.
1864. Baegert, Jacob. Aboriginal inhabitants of the California peninsula. S.R.
1864. Dean, John. The gray substance of the medulla oblongata and trapezium.
S.C., xvi.
1864. Troyon, Fred. On the crania helvetica. S.R.
1864. Gibbs, G. The intermixture of races. S.R.
1864. Morlot, A. The study of high antiquity in Europe. S.R.
1865. Petitot, E. Account of the Indians of British America. S.R.
1866. Gibbs, G. Notes on the Pinneh or Chepewyan Indians of British and Russian America. S.R.
1866. Von Hellwald, F. The American migration; with notes by Prof. Henry.
S.R.
1866. Scherzer; Schwarz. Table of anthropological measurements. S.R.
1867. Darwin, C. Queries about expression for anthropological inquiry. S.R.
1867. Pettigrew, J. B. Man as the contemporary of the mammoth and reindeer
in middle Europe. S.R.
1867. Meigs, J. A. Description of a human skull from Rock Bluff, Ill. S.R.
1867. Smart, C. Notes on the Tonto Apaches. S.R.
1867. List of photographic portraits of North American Indians in the gallery
of the Smithsonian Institution. S.M., xiv.
1868. Broca, P. History of the transactions of the Anthropological Society of
Paris, from 1865 to 1867. S.R.
1870. Swan, James G. The Indians of Cape Flattery. S.C. xvi.
1870. Gardner, W. H. Ethnology of the Indians of the valley of the Red River
of the North. S.R.
1870. Blyden, E. D. On mixed races in Liberia. S.R.
1871. Grossmann, F. E. Pima Indians of Arizona. S.R.
1872. Broca, P. The troglodytes, or cave dwellers, of the valley of the Vézère.
S.R.
1873. Mailly, E. Estimate of the population of the world. S.R.
1873. Gillman, H. The mound-builders and platycnemism in Michigan. S.R.
1874. Mailly, E. Eulogy on Quetelet. S.R.
1874. Schumacher, P. Ancient graves and shell-heaps of California. S.R.
1874. Farquharson, R. J. A study of skulls and long bones, from mounds near
Albany, Ill. S.R.
1874. Tiffany, A. S. The shell-bed skull. S.R.
1876. De Candolle, A. Probable future of the human race. S.R.
1876. Gillman, H. Characteristics pertaining to ancient man in Michigan.
S.R.
1876. Swan, J. G. Haidah Indians of Queen Charlotte's islands, British Colum-
bia. S.C., xxi.

1876. Brackett, A. G. The Sioux or Dakota Indians. S.R.
1876. Jones, Joseph. Explorations of the aboriginal remains of Tennessee. S.C., xxii.
1877. Galt, F. L. The Indians of Peru. S.C.
1877. Gibbs, George. Tribes of western Washington and northwestern Oregon. C.E., i.
1877. Dall, W. H. Tribes of the extreme Northwest. C.E., i.
1877. Brown-Séquard, C. E. Dual character of the brain. S.M., xv.
1878. Hart, J. N. de. The mounds and osteology of the mound builders of Wisconsin. S.R.
1878. Dall, W. H. On the remains of later pre-historic man. S.C., xxii.
1879. Pratt, R. H. Catalogue of casts taken by Clark Mills, Esq., of the heads of sixty-four Indian prisoners of various western tribes, and held at Fort Marion, St. Augustine, Fla., i.
1879. Havard, V. The French half breeds of the Northwest. S.R.
1880. Mason, Otis T. Record of recent progress in science. Anthropology. S.R.
1881. Powell, J. W. On limitations to the use of some anthropologic data. R.B.E., i.
1881. Mason, Otis T. Anthropological investigations.
1881. Index to anthropological articles in publications of the Smithsonian Institution. George H. Boehmer.
1881. Mason, O. T. Anthropology. (Bibliography of anthropology; abstracts of anthropological correspondence.) S.R.
1882. Fletcher, R. Prehistoric trephining and cranial amulets. C.E., v.
1882. Rau, Charles. Articles on anthropological subjects contributed to the Annual Reports of the Smithsonian Institution from 1863 to 1877, pp. 180.
1885. Donaldson, Thomas. The George Catlin Gallery in the U. S. National Museum, with memoirs and statistics. R.N.M., i.
1886. Mason, Otis T. The Chacacayo trephined skull. R.N.M.
1887. Thomas, C. Burial mounds of the northern sections of the United States. R.B.E., v.
1887. Porter, J. H. Notes on the artificial deformation of children among savages and civilized peoples. S.R.; R.N.M.
1887. MacCauley, Clay. The Seminole Indians of Florida. R.B.E., v.
1888. Results of an inquiry as to the existence of man in North America during the paleolithic period of the Stone Age. R.N.M.
1888. Niblack, Albert P. The coast Indians of southern Alaska and northern British Columbia. R.N.M.
1888. Wilson, Thomas. A study of prehistoric anthropology: Handbook for beginners. R.N.M.
1890. Evans, John. Antiquity of man. S.R.
1890. Hitchcock, Romyn. The Ainos of Yezo, Japan. R.N.M.
1890. Wilson, Thomas. Criminal anthropology. S.R.
1890. Hitchcock, Romyn. The ancient pit-dwellers of Yezo. R.N.M.
1890. Wilson, Thomas. Anthropology at the Paris Exposition in 1889. R.N.M.
1890. Romanes, George J. Weismann's theory of heredity. S.R.

1891. Thomas, Cyrus. Catalogue of prehistoric works east of the Rocky Mountains. B.B.E., 12.
1893. Rockhill, William Woodville. Notes on the ethnology of Tibet.
1895. Wilson, Thomas. The antiquity of the red race in America. R.N.M.
1895. Hamy, E. T. The yellow races. S.R.
1896. Hoffman, Walter James. The Menomini Indians. R.B.E., xiv.
1897. McGee, W. J. The Siouan Indians. R.B.E., xv.
1897. Muñiz, M. A., and McGee, W. J. Primitive trephining in Peru. R.B.E., xvi.
1898. McGee, W. J. The Seri Indians. R.B.E., xvii.
1898. Haeckel, Ernst. On our present knowledge of the origin of man. S.R.
1902. Gaudry, Albert. The Baoussé-Roussé explorations: Study of a new human type, by M. Verneau. S.R.

CONCLUSION

The preceding notes close a rapid and doubtless still imperfect survey of the history of physical anthropology among the English-speaking people of northern America, so far as connected with those no longer living. Interdigitating closely with the more recent chapters of this history is the unfinished, richer, and more organized portion which rests in the hands of those who are still active. This will be dealt with in the final section.

Looking backward into the above history, we see on the whole very creditable, though more or less sporadic and irregular, beginnings, and an irregular, often defective, course, yet not without lasting results. The development proper of the branch belongs to the more recent period—development now based on great and accurately identified collections, nourished by advancing systematic training and regulation of methods, definitely conscious of the immense and complex field of research ahead, and confident that in coöperation with closely allied branches of science physical anthropology is destined to serve worthily these countries and humanity in general.

The influences on and direct participation in American anthropology of various scientific societies and journals, and of foreign men of science, have been mentioned only casually and must be left for a future dissertation on the subject. Suffice to say that the foremost among our societies whose activities favored the advance of physical anthropology were the Anthropological Society of Washington (1879–); the American Ethnological Society of New York (1842–; 1899–); the Boston Society of Natural History (1830–); the American Association for the Advancement of Science, Section *H* (1882–); and the American Anthropological Association (1902–). Among journals especial credit is due to the

American Naturalist (1867-); to *Science* (1880-), and above all to the *American Anthropologist* (1888-), besides which there are the periodical publications of the Smithsonian Institution and its branches, the Reports of the Commissioner of Indian Affairs, the publications of the Peabody Museum of American Archeology and Ethnology, and those of The Academy of Natural Sciences of Philadelphia, the American Museum of Natural History, and other institutions. All these include contributions to physical anthropology.

As to foreign men of science who have most influenced the progress of our science in America, the list includes Blumenbach, Gall, Prichard, Lawrence, Anders Retzius, Broca, Quatrefages, Hamy, Topinard, Barnard Davis, Flower, Kollmann, E. Schmidt, and Rudolph Virchow, besides those of more recent date.

Finally, there are also a number of additional American names connected with isolated publications or noteworthy collections pertaining to physical anthropology, which will deserve a more extended reference in some future publication on this subject. They include men like Emil Bessels, known for his contribution on Eskimo crania⁶³ and that on "The Human Remains found among the Ancient Ruins of South-Western Colorado and Northern New Mexico;"⁶⁴ A. F. Bandelier, who collected a large amount of skeletal material in Bolivia for the American Museum of Natural History, and gave us several publications of interest to physical anthropology; A. F. Chamberlin, whose activities are so recent that they could be as conveniently treated in the last section of this memoir; Dr. Robert Fletcher, the librarian of the Army Medical Museum, who gave us several publications bearing directly on anthropology;⁶⁵ H. Gillman, who wrote on crania and platycnemism in Michigan;⁶⁶ Dr. George W. Peckham, to whom we owe a contribution

⁶³ Einige Worte über die Inuit (Eskimo) des Smith-Sundes, nebst Bemerkungen über Inuit-Schädel, *Archiv für Anthropologie*, 1875-1876, VIII, 107-122.

⁶⁴ *Bull. U. S. Geological & Geographical Survey*, 1876, II.

⁶⁵ Paul Broca and the French school of anthropology. A lecture deliv. in Nat. Mus., 8 vo., Wash., 1882, 32 pp. Also in Saturday Lect., Wash., 1882, 113-142.

On prehistoric trephining and cranial amulets. *Contrib. N. Am. Ethnol.*, Wash., 1882, v, repr., 30 pp.; also abstr., *Tr. Anthropol. Soc.*, Wash., 1882, I, 47-51.

Human proportion in art and anthropometry. Cambridge, 8 vo., 1883, 37 pp.

The new school of criminal anthropology. *Am. Anthropol.*, Wash., 1891, IV; repr. 38 pp.

Anatomy and art. *Bull. Phil. Soc. Wash.*, 1895, XII; repr. 24 pp.

⁶⁶ See p. 176.

on "The Growth of Children" of Milwaukee;⁶⁷ M. S. Severance, who gave us a contribution on south-western crania;⁶⁸ Paul Schumacher, to whom we owe the large collections of California crania now in the Peabody Museum⁶⁹ at Cambridge and the U. S. National Museum; and still others.

The history of physical anthropology in Mexico, Central and South America, remains to be written. It cannot compare in richness with that of the United States and Canada. The southern countries have served more as the resources rather than the home of our branch of science. Their literary contributions to physical anthropology, if we exclude those of foreign and the still living authors, are very meager. Ameghino's publications on the subject of early man in Argentina, have been dealt with in another place.⁷⁰ In Peru a collection of crania had been made by Raimondi; the foreign contributions to Peruvian anthropology are given in the writer's reports on that country.⁷¹ In Mexico, if we exclude what has been done relatively recently, we have little to mention, but the history of anthropology in that country is being prepared by Dr. Nicolas Leon.

⁶⁷ *6th Annual Report State Bd. of Health of Wisconsin.*

⁶⁸ Mark Sibley Severance and H. C. Yarrow—Notes upon human crania and skeletons collected by the expeditions of 1872-74. *Rep. U. S. Geog. Sur.* West of 100th Meridian, Wash., 1879, vii, 391-397.

⁶⁹ *Sixteenth Report Peabody Museum, Cambridge, 1884; ix, 233-259.*

⁷⁰ Early man in South America. *Bull. 52. B. A. E., Wash., 1912.*

⁷¹ *Smithsonian Misc. Coll., 1911 and 1913.*

THE ORIGINS OF THE CHINESE

E. T. WILLIAMS

Chief, Far Eastern Division, Department of State

If by "Chinese" we mean the inhabitants of China, then we have more than one race origin to trace, for the population of China is very complex. We have there not only the five peoples symbolized by the five-barred flag—the Chinese, Manchus, Mongols, Turki, and Tibetan—but there are also the numerous indigenous tribes still maintaining more or less their separate ancient organizations, such as the Miao, the Lolos, who are said by Richard to be Indo-European,¹ the Man-tzu, the Shan, the Sifan, the Lisu, and the Musu with many others in southwest China, and the Tunguses, Daours, Solons, Koreans, Buriats and Orotchis or Fish-skin Tartars in the northeastern parts of the country. We can not ignore these tribes, but this paper is particularly meant to discuss the origin of that element of the population which constitutes the principal stock of China, which is distinguished from all other elements as the real Chinese strain, that which anciently subdued and to a large extent absorbed the indigenous tribes, and which gave character to the civilization which was developed, if it did not originate in the region which we call China.

Whence came this virile people which at so early a period of the world's history developed such a high form of civilization and which imposed its culture upon the entire eastern half of Asia; which not only gave law, religion, letters, and art to the land we call China, but art and architecture, literature, law and religion to Japan and Korea, and in a large degree also to Manchuria, Mongolia, Burmah, Siam and Annam? And what were they from the standpoint of physical anthropology?

Dr. Frederick Hirth, of Columbia University, rejects the theory of a foreign origin of the Chinese with the statement:

¹ Père Richard, *Comprehensive Geography of the Chinese Empire and Dependencies*; translated into English by M. Kennelly, S. J. Shanghai, 1908, 342.

"Chinese literature contains no record of any kind which might justify us in assuming that the nucleus of the nation may have immigrated from some other part of the world, and the several ingenious theories pointing to Babylonia, Egypt, India, Khotan and other seats of ancient civilization as the starting points of ethnical wanderings must be dismissed as untenable. Whether the Chinese were seated in their later homes from time immemorial, as their own historians assume, or whether they arrived there from abroad, as some foreign scholars have pretended, can not be proved to the satisfaction of historical critics."²

Père Richard, on the other hand, in his *Comprehensive Geography of China*, says:

"The Chinese race is very ancient. According to the oldest records it first occupied the valley of the Yellow River in Kansu, Shensi and Honan. If we wish to solve the problem as to whence it came, indications seem to point to Chaldea or Assyria."³

In another passage he answers his own query as to whether the Chinese had come from the southwest via Burmah, from the north via Siberia, or from the northwest by the valley of the Yellow River by saying:

"In the absence of trustworthy documents we shall follow Chinese traditions according to which the 'Hundred Families' (Po Chia), the black-haired race, came from the West."⁴

Thus it would seem that there is a difference of opinion among sinologists as to what the native traditions affirm.

Dr. L. Wieger, a Jesuit missionary in China, in his *Textes Historiques*, holds quite another opinion, which I translate as follows:

"The Chinese say nothing of the origin of their race. They have preserved but few traces of their early times. But they have fixed in the drawing of their ancient ideographs a certain number of features of their condition at that time. Since these characters undoubtedly existed in the thirtieth century before the Christian Era, it is to that period that we must carry the paleontological restoration which we would examine. Withered and defective in many points, as is true of everything connected with fossils, nevertheless it has its interest. Most of the vegetable and animal figures in these ancient characters belong to a tropical country. This fact renders improbable the theory, according to which the ancestors of the Chinese coming from the West, crossed the Pamirs and traversed the Tarim Basin to enter finally into the north of China by the upper waters of the Yellow River. It is probable that having come from the region now known

² *Encyclopedia Britannica*, 2d ed., VI, 191.

³ Père Richard, *o.c.*, 339.

⁴ *Ibid.*, 4.

as Burmah, they entered China from the southwest, following the route of which the modern steps are Bhamo, Molmein, Yung-chang Fu, Ta-li Fu, Yun-nan Fu, Kuei-yang Fu, Chang-te Fu, and the Tung-ting Lake. It is necessary to represent this entrance not as one far-away migration, but as the gradual extension of a tribe towards the northeast, which remained in touch with its source from which it differentiated itself later by the adoption of its own particular civilization."⁵

Mr. T. W. Kingsmill, an English sinologue, long resident in China, in the *Journal of the China Branch of the Royal Asiatic Society*, says:

"The original introduction of the arts and civilization of China was due to the Cheos, an Aryan race, who, driven from their original home on the upper Oxus by the encroachment of the Turkish hordes from the north, found refuge after long wanderings in the extreme northwest of China some twelve centuries before our era. . . . The cult, the family law, and the fundamentals of the language itself are essentially Aryan and Aryan of a type not essentially different from the settlers of northern India."⁶

Prof. Terrien De Lacouperie in an introductory chapter to Colquhoun's *Amongst the Shans*, concludes:

"China has received its language (since altered) and the elements of arts, sciences and institutions from the colonies of the Ugro-Altaic Bak families who came from Western Asia some twenty-three centuries B. C. under the conduct of men of high culture acquainted through their neighbors, the Sûsians, with the civilization which emanated from Babylonia and was modified in its second focus."⁷

Mr. Soothill, an English scholar, author of a translation of the *Analects of Confucius*, says in his introduction to that work:

"The origin of the Chinese, like that of other nations of the earth, is veiled in the mystery of unrecorded aeons . . . Were they one of the many Mongolian tribes which occupied the Far East when Asia was still joined to the continent of America . . . or did they as is generally advocated, some three thousand years before Christ, leave the original habitat of civilized humanity in western Asia in obedience to some great centrifugal movement which drove the tribes of mankind forth from their common center to replenish the earth and subdue it? . . . Let us at any rate accept this as the most reasonable theory."⁸

The Rev. John Ross, D.D., a missionary in China for thirty-eight years, in a posthumous work called *The Origin of the Chinese People*, shows the following attitude:

⁵ Wieger, L. *Textes Historiques*, I, 15-16.

⁶ *J. of the China Branch of the Roy. Asiatic Soc.*, Shanghai, xxxii, No. 1, 1897-98, 19.

⁷ Colquhoun (A. R.) *Amongst the Shans*. N. Y., 1885, Introd. xxix.

⁸ *The Analects of Confucius*. Transl. in Soothill (W. E.), Yokohama, 1910, 1.

"From what is recorded of the mythical ages of the Chow, Chin and Han Dynasties, we are justified in concluding that the Chinese people are autochthonous and their civilization indigenous."⁹

Prof. Herbert A. Giles in a preface to Dr. Ross's work, after lamenting his death, says:

"Dr. Ross would have nothing to do with the fantastic and unsubstantiated theory which traces the civilization of China and particularly her script to the ancient inhabitants of Acadia."¹⁰

And after making the quotation which I have just made above he adds:

"In this important statement I entirely agree with him."¹⁰

There is, then, no lack of opinions upon the subject and no lack of strong language in stating them.

The student of the question at the present day has thus three distinct theories to examine:

1. That the Chinese originated in the Indo-Chinese peninsula and migrated northward into what is now China.
2. That the Chinese race is autochthonous.
3. That the race had its origin in central or western Asia.

The first theory is not without plausibility. (1) In addition to the alleged testimony of the ideograms as pointing to a tropical country as the place of their origin, we are asked to note (2) that the Chinese language is tonal and seems more nearly related to the languages of the Malay Peninsula than to others. (3) The oldest forms of the Chinese language are found to-day in southern China. (4) Chinese is purer in the south and grows more and more corrupt as one approaches the north.

All this would seem to support the theory of a southern origin for the Chinese, but a careful examination throws doubt upon the first statement that the ideograms indicate a tropical origin for the language. The facts mentioned under captions 2, 3, and 4 are also capable of other explanations than those given. With respect to the ideograms we do not know which of them existed so long ago as 3,000 years before Christ. They were not all formed at one period. They grew slowly in

⁹ Ross (Rev. J.) *The Origin of the Chinese People*. Edinburgh and London, 1916, 50.

¹⁰ *Ibid.*, Introduction.

number with the experience of the race. In addition it should be said that the earliest ideograms known to us contain pictures not alone of tropical plants and animals but also of those known only in the colder regions of the north, so that the evidence of the ideograms can just as well be quoted in favor of a northern origin for the Chinese. Soothill states correctly that the ideographs for sheep and cattle occur in many root words and indicate a nomadic life as shepherds and herdsmen for the Chinese forefathers. Among those given by Chalfant under the primitives of the Shuo Wen are representations of the following animals: rhinoceros, hare, cobra, bear, swallow, ox, yak, dog, sheep or goat, tiger, pig, elephant, dragon, unicorn, horse, fish, deer, toad, rat and tortoise, and of such vegetables as the melon, bamboo, clover, wheat, grass, hemp, flax, and millet. The San Edict, which dates from about 1122 B.C., mentions the elephant and the willow and apple tree. Inscriptions on bone and tortoise shell, written about the same time as the San Edict, give pictures of the horse, the dragon, the stag, birds, the scorpion, the tiger, and the rat. I submit that these are not especially tropical animals or plants but nearly all of them those of a temperate region.

As for the other facts mentioned as pointing to a southern origin for the Chinese, there is nothing that cannot be just as easily accounted for by assuming that the Chinese came from the north in successive waves in which the later arrivals crowded their relatives who preceded them farther and farther southward, so that the Mon-Khmer, the Shan, Siamese and Burmans, whose languages also are tonal, and the earliest Chinese whose language is said to be purest, would be found far to the south, as in fact they are, while the later comers would be found in the north mingled with various other races who have pressed down upon them from the northeast, and whose languages have modified that of the Chinese.

Prof. Terrien de Lacouperie, in his introductory chapter to Colquhoun's *Amongst the Shans*, writes of the "Cradle of the Shan race" as follows:

"Many non-Chinese tribes within and without the boundaries of southern China, remnants of the non-absorbed non-sinicized parts of larger stocks of several races, driven south-westwards are now scattered over a large area into an undefined number of fragments . . . With the exception of the northern region, which was supplied with a constant renewal of Altaic and Ugro-Finnish blood pouring into the Chinese agglomeration, they formerly composed the native population of China Proper."¹¹

¹¹ Colquhoun, (A. R.) *o.c.*, Intro. xxii.

It is, of course, a well-known fact that, whereas Mandarin Chinese is spoken in northern, central, and western and southwestern China, in the southeastern provinces we have a multitude of dialects all related one to another, much as the Latin tongues of Europe are related to each other. Among these the Cantonese perhaps most nearly resembles the early form of the Chinese. The pressure which scattered these tribes along the southeastern coast of China seems to have come from the northwest.

We also find some of the ancient non-Chinese tribes still living under their own chiefs in the mountainous parts of southwest China. Among these are the Miao, who are mentioned in the *Shu King*, one of the oldest books of China.¹²

Colquhoun, in the volume to which I have referred above, *Amongst the Shans*, says:

"The Kuoi, Por, Samre, Phuong, Sheng, and Pru and their cognate tribes in Cambodia, who all speak tonic languages, are the modern representatives, diversified by subsequent interminglings, of two successive migrations of tribes formerly settled on Chinese soil. They were driven out of Kuangtung and Kuangsi in 215 B. C., but their location formerly was much further north, on the north bank of the Yangtze whence they were driven away by the Shans."¹³

Here, then, we have the Shans driving these earlier inhabitants of China from the Yangtze region into Kuangtung and Kuangsi, whence at a later period (215 B.C.) they were forced still farther south into Cambodia. To-day the Shans themselves are found far to the southwest, in Siam and Burmah. The migrations of population in these parts of China, then, would seem to have been from north to south. Present-day movements, generally speaking, are still in the same direction. Among the inhabitants of Burmah are the Karens, yet the Karens originally dwelt in China, near the Tungting Lake, and according to Colquhoun, it was not until 778 A.D. that they were driven out. There are now in Kueichow Province certain tribes related to them. "The Karens call the Chinese their younger brothers," so Holt S. Hallett tells us in his *Historical Sketch of the Shans*.¹⁴

The Nan Chao, which spread all over south China after 345 A.D., established there a kingdom which in 860 A.D. was known as the Ta-li Kuo. This was a Shan state and was not overthrown until the thir-

¹² *The Shu King*, a Chinese work, "The Classic of History." Transl. in Legge, (J.), *Chinese Classics*, III, London, 1861-72.

¹³ Colquhoun. (A. R.) *o.c.*, 46.

¹⁴ *Ibid.*, Appendix by Holt S. Hallett, 341.

teenth century A.D., when it was conquered by the Mongols. The Burmese, too, came down from the north and northwest into their present seats. Sir George Scott in his *Handbook of Burmah* says:

"The only tribe in Burmah that is not Indo-Chinese is the Selung or Selon, whose language shows affinities with that of the Tsiam, or Cham, of Cambodia and with that of the Negritos in the Philippines."¹⁵

Grierson, whom Scott quotes as authority, thinks that the earliest inhabitants of Burmah were progenitors of the Australians. The remainder of the population of Burmah are all related. Scott says:

"*The Burmese National History* states that the first king came from the country of the Sakya in northern India, but a majority of modern students do not agree with the chronicle and have it that they came from northwest China."¹⁶

This tradition, however, seems to be easily explained. The handbook continues, saying:

"The probability is that that part of the world (northwest China) was the original home of the Tai and that west of that, that is to say, from eastern Tibet, came the Mon Khmer, perhaps originally displaced by a movement of the Tibeto-Burmans."¹⁷

This seems not improbable if we accept Logan's theory that the original home of the Burmans was on the northern slopes of the Tien Shan, extending eastward across a great part of the Tibetan Plateau to the upper valleys of the Brahmaputra and Irrawaddy. If any physical or political occurrence in that region forced the Tibeto-Burmans to move, they would probably find least resistance in pressing into the lands of the Mon Khmer, who in turn would be forced down the Irrawaddy and Brahmaputra Rivers.

Now the Sakyas were no doubt Aryan, but their subjects for the most part were not. Asoka and his grandson sent missionaries across and along the Himalayas and introduced Buddhism into Tibet. These missionaries would have much to say of Sakyamuni, the Buddha, and of his family and it would be natural for their converts to cherish these accounts. Their descendants long after emigration into what is now Burmah would then be not unlikely to confuse the home of the mis-

¹⁵ Scott (J. G.). *Burma, a Handbook of Practical Information*; with special articles by recognized authorities on Burma. New ed., London, 1911, 6.

¹⁶ *Ibid.*, 64.

¹⁷ *Ibid.*, 64.

sionaries and of the Buddha with that of their own ancestors and speak of their first king as coming from the land of the Sakyas.

As the Mon Khmer pressed into the homes of the Selung, or aborigines of Burmah, the latter would be driven to the southern extremity of the land or into the mountains, in both of which places, indeed, we find them.

Subsequently the Tibeto-Burmans, by some strong pressure exerted upon them from the north, were in turn forced down the valley of the Irrawaddy where they were first found about 600 B.C. Later they made their way into Burmah.

We find, then, a succession of waves of migration into Burmah, all coming from the northwest.

1. There came the Mon Khmer, who crowded the Negrito (or mixed tribes) into the mountains or toward the sea and who were followed by—

2. The Tibeto-Burmans, who drove their predecessors into the hills or over the border into Siam, and these Tibeto-Burmans were followed by—

3. The Siamese-Chinese, or Karens, and by the Tai, or Shans.

4. More recently the Chingpaw have followed the trail but have been stopped by the British occupation of Burmah.

The Tibeto-Burmans, we are informed, have left their traces all along the route in affiliated tribes.

The early history of the people of Siam shows similar features. Mr. A. W. Graham in his *Handbook of Siam* says that there is among the mountains of southern Siam a small black people with curly hair, unlike the rest of the population, which he thinks belong to the Negrito race, allied, he believes, to the Andamanese, to certain tribes in Burmah (by which, I presume, he refers to the Selung), and also related to the Negrito of the Philippines. He says they are called "Aborigines of India." I quote from him this further statement:

"It is now the very generally accepted theory that, during the last few thousand years, Siam, and in fact the whole of Further India, has been subjected to periodical flooding by successive waves of humanity, set moving by natural or social upheavals of population far to the north in Central Asia. We may imagine then the Negrito population of Siam or rather of that part of what now constitutes Siam which was then above the sea, leading their primitive existence through countless generations, their condition scarcely advanced beyond that of their celt-wielding fore-runners, until there came down upon them one of these great waves of population which broke them up, thrust them aside into the remoter hills, all but exterminated them, and finally settled itself down in their place.

This irresistible tide of humanity was the advance down all the rivers of Further India of the tribes which constituted what is conveniently called the Mon-Annam Family, the savage ancestors of the Mon, or Talaing, the Khmer, or Cambodian, and the Annamese, civilized races of yesterday and today, and of a host of lesser tribes which still persist in quasi-barbarism."¹⁸

Graham agrees with Sir George Scott in placing the Tibeto-Burman invasion about 2000 or 3000 years ago and the Mon-Khmer invasion much earlier.

About 2500 years ago, about the same time that the Tibeto-Burmans were pressing down the Irrawaddy, the Laos in southwestern China attacked and subdued some of the Mon-Khmer who had been left behind and drove them into Siam. In after years the Laos became a great power in that part of the world and threatened Chinese supremacy until conquered in the thirteenth century A.D. by Kublai Khan, as said above.

In the appendix to Colquhoun's *Amongst the Shans* is a chapter by Holt S. Hallett devoted to the tribes of Yunnan from which I gather the following conclusions: The Chinese, the Shans, and the Tibeto-Burman families are more closely connected with each other than either of them with the Mon-Khmer family. The Mon-Khmer speaking races appear to have split off at a very remote period from the original stock. They inhabited a large portion of China and Indo-China before the Chinese proper came in.¹⁹ To-day the Shan and the Mon-Khmer speaking races do not extend north of 25 degrees north latitude, but they are found in all the country south of that right down to the sea. It seems probable that all China south of the Yangtze was once inhabited by men speaking languages of this type.²⁰ The inference is that both the Shan and the Mon-Khmer speaking races came out of that part of China lying northeast of Siam and were pressed southwestward by the slow advance of the Chinese, just as the Miao and the Yao of the present day are being pressed into Tonkin by the same cause.²¹

The movement of races, therefore, seems to have been in general from north to south and not vice versa. This belief is strengthened by the fact that the aborigines of the Indo-Chinese peninsula are steadily decreasing in numbers. In 1901 in Burmah there were but 1325 Selungs

¹⁸ Graham (A. W.) *Siam: A Handbook of Practical, Commercial and Political Information*, London, 1912, 99.

¹⁹ *Ibid.*, 358.

²⁰ Graham (A. W.) *o.c.*, 368.

²¹ *Ibid.*, 364.

reported in the census as against 1628 ten years earlier. There has not been a rapid growth of native races in the south forcing waves of emigration northward, but contrariwise, an invasion of foreign races from the north that has well-nigh destroyed the aboriginal inhabitants of Burmah. The same conditions apparently have obtained in Siam and Cambodia. H. R. Davies in a volume called *Yunnan, the Link between India and the Yangtze* says:

"Whatever the pure Chinese may have been five thousand years ago, it seems historically certain that the Chinese of the present day have grown up out of the gradual welding into one empire of Tartar tribes from the north and of Mon-Khmer, Shan and possibly to some extent of Tibeto-Burman races who were originally in occupation of much of the country that has grown into China."²²

He also believes that the Cantonese are very probably Shan in blood to a great extent, although they have adopted Chinese customs and ways of thought.²³

If we try to picture to ourselves southeastern Asia in 1100 B.C. we must think of the regions we call Annam, Cambodia, Siam and Burmah and probably a portion of southern China as inhabited, to some extent at least, by a race of small, black, curly-haired savages, who were being driven gradually into the mountains or southward toward the sea by a people distantly related perhaps more to the Hindu than to the Chinese, known as the Mon-Khmer, whose descendants are at the present day scattered in Cambodia, Siam and Burmah, and to whom the Miao of Yunnan are related. We must think of central and western China as peopled at that period by men more nearly related to the Chinese, known as the Lao, or Shan, the progenitors in great degree of the Siamese. Northwest of them we must picture the Tibeto-Burmans as dwelling, relatives of some of the modern Burmese and of the Tibetans, while in the upper valley of the Yellow River there had already settled a people, ruled by the Chous, who later were called Chinese, but who evidently were even then a racial conglomerate.

Whence came this Chou people? Evidently they did not come from the south, for, as we have seen, the tide of migration in the southern territories was from north to south and not vice versa, and they were even then pressing southward upon the Shans and other tribes in that region whom to-day they have almost entirely displaced. In the moun-

²² Davies (H. R.) *Yunnan, the Link between India and the Yangtze*. Cambridge, the University Press, 1909, 368-369.

²³ Davies (H. R.) *o.c.*, 379.

tains of Kueichou there are at the present day some 50 tribes of the Miao (some say 70) living mostly under their own chiefs, and having their own language and institutions. These are the descendants of the Miao mentioned in the Shu King as being hostile tribes in the days of Shun, 2300 B.C. They call themselves Meng, which is perhaps the same word as Mong in Burmese and Muang in Siamese, a name which possibly indicates a connection with the Mon-Khmer. Indeed the inhabitants of southern China even to-day are known as Man-tze, especially if a depreciatory epithet is desired. This term is the origin of the name "Manzi" used by Marco Polo in his account of southern China²⁴ and is probably derived from the ancient designation of the Miao and the Mon-Khmer.

In the twelfth century B.C. there were many tribes in China in addition to those which have already been mentioned. Surrounding the kingdom in the Yellow River Valley which was ruled by the Chous, there were the Jung, the Shu, the Chiang, the Mao, the Wei, the Lu, the P'eng, and the P'u west and southwest, and in the north and northeast the six tribes of Red Ti and three of the white, together with the four tribes of I. The eight western tribes assisted the Chous in overthrowing the Shang Dynasty. It seems not unlikely that these were allied by race to the Chous and more distantly to the early Chinese also. The I tribes which were located east of old China in modern Shantung were also no doubt related to the ancient Chinese race, for Mencius tells us that the Emperor Shun was an I.²⁵

On the other hand it seems highly probable that the Ti tribes, who are represented in the Chinese written language by a character compounded with the ideogram for "dog"—intentionally offensive—may have been of an entirely different race. These tribes located in what is now northeastern China were possibly related to the Tunguses, or Siberians. All these tribes, I and Ti, seemed to have been absorbed by the Chinese. As to the relationship between the Chinese and the Tartar tribes it has been one of almost constant warfare from ancient times. The history of this intercourse suggests that two streams of migration probably met in China and engendered a hostility still unended, which has resulted at one time in the triumph of one race and at another in the triumph of the other.

²⁴ *The Book of Ser Marco Polo*, translated and edited by Col. Sir Henry Yule, 3d ed., N. Y., 1903, I, 36; II, 145, and elsewhere.

²⁵ *Mencius*; one of the Chinese classics. Transl. in Legge's *Chinese Classics*, II, London, 1861-72. A later translation by the same author, 1875, London. in *The Life and Works of Mencius*.

The advocates of the theory that the Chinese are autochthonous insist that these tribes, east and west of the ancient kingdom of China, were barbarous and only became civilized as they were gradually absorbed by the Chinese; that the early Chinese evolved a civilization of their own there on the banks of the Yellow River and that it extended thence to the surrounding peoples.

The theory of the autochthonous origin of the Chinese applies evidently more to their culture and to the nation as a political unit rather than to their derivation. No one surely would wish to sustain the hypothesis that the Chinese evolved in China from some separate stock of human ancestors.

Dr. Frederick Hirth, Rev. John Ross, and Prof. Herbert Giles are among those who tell us that we need not try to find any origin for the Chinese people outside the Yellow River Valley in which they were living in the twelfth century B.C. and undoubtedly for a long time before that date. They assure us that they gave up nomadic habits and became settled agriculturists there in an unknown antiquity, so that it is folly to try to find some connection between them and their institutions and the people and institutions of any other part of the world. Dr. Ross' remarks in this connection are significant. He says:

"The Chinese were therefore not a homogeneous race. They were not descended from an unmixed race. Hundreds of barbarian kingdoms, as conquerors or as conquered, came under the molding influence of the tiny Middle Kingdom which was born in and developed from, the northeast corner of Honan."²⁶

He pictures them as settling on the bank of the Yellow River, tilling the soil, adopting laws, developing institutions and inventing various arts, among them that of writing. "All these changes," he declares, "took place in the nucleus formed among the savages in northeast Honan, who were the embryo of the Chinese nation." He admits that the people styled barbarian were of the same race as the Chinese and holds that they were called barbarous because they refused to accept Chinese civilization. Again he says:

"We have traced the cradle of the Chinese people and the origin of the race, but the region of the origin of their Turanian predecessors remains an unknown problem."²⁷

²⁶ Ross (Rev. J.) *o.c.*, 51.

²⁷ *Ibid.*, 59.

But even Dr. Ross cannot avoid suggesting a solution of the problem. Although he insists so strongly on the autochthonous character of the Chinese nation, he has this to say of their forbears:

"Investigation of the anthropological facts available leads the student to the inference that north-eastern Europe and the high latitudes of Asia were in the remotest known times inhabited by peoples of the Turanian race. The inhabitants of eastern Asia were of kindred race, with the possible exception of the Hairy Oinos of northern Manchuria From among these (inhabitants of eastern Asia) a small community began on the south bank of the Yellow River to cultivate grain in a crude fashion. This life necessitated a permanent abode and personal possessions. Thus and here was the 'embryonic beginning of China.'"²⁸

The principal reason advanced for believing that the Chinese race is autochthonous is that Chinese history contains no record of a migration from other regions and seems to assume that the earliest events of which it takes note occurred in the valley of the Yellow River, near the southern bend toward the east where it is joined by the river Wei.

That Chinese history has nothing to say of any migration of the people from some other part of the world can only be considered evidence of a negative character and, moreover, must be allowed to have very little weight when one remembers that contemporary records have not been preserved of any events of that history for a thousand years or more after such a migration is assumed by some to have taken place.

Exception, too, must be taken to the statement that Chinese history assumes the earliest events of which it preserves record to have occurred in the lower valley of the Yellow River. This is no doubt true for the most part of the record in the *Shu King* or Classic of History, although there is some doubt as to the region over which the Emperor Yao was reigning at the opening of that history, but the earlier incidents of Chinese history to which reference is made by Sze-ma Ch'ien and other writers can not with certainty be said to have had place in that valley. This leads us to a consideration of the fourth theory, that of a western origin for the Chinese race. There are some facts which are difficult of explanation upon the assumption that the Chinese are autochthonous. If, then, we are disposed to look for an origin outside the boundaries of what is known to-day as China, it is evident that since they did not come from the south and can hardly have originated in the east or north, we must look for the cradle of the race in the west.

We must at the very beginning refuse to admit Dr. Ross's assumption that the tiny Middle Kingdom, or Chung Kuo, was the sole or principal repository of Chinese culture. Two of the earliest emperors mentioned in the Classics of History are Yao and Shun. They are held in equal reverence by the Chinese as founders of the nation. Yet Mencius tells us that Shun came from the *I* tribe of the east.²⁹ This character *I* is commonly translated by Europeans and Americans as "wild" or "barbarous," but the word itself is a proper name and originally had no such meaning. Such a meaning became attached to it only in later times.

Another hero held up in every Chinese school as a model of virtue, was Wen Wang, or King Wen, the father of the founder of the Chou Dynasty. Mencius says of him that he belonged to the *I* of the west.³⁰ European and American scholars generally translate this passage by "the wild tribes of the west," but, as I have just said, the word *I* does not necessarily mean "wild." Now we are told that Yao passed over his own son and chose Shun to be his successor because held to be the most worthy man in the kingdom. But, if he thus passed over the best men in his own state and selected a man from the *I* tribe, it can only be concluded that even the *I* were not wanting in some degree of civilization. The Canon of Yao tells us that this ancient sovereign gave his two daughters in marriage to Shun after he had chosen the latter to be heir to the throne.³¹ It seems extremely probable, therefore, that we have here something more than the selection of the most worthy man for heir, that there may be here an echo of a conflict resulting in the defeat of Yao and the consolidation of two states strengthened by the marriage of Shun with the two princesses, which may indeed have been one of the conditions of peace.

After the overthrow of the Shang Dynasty in 1122 B.C. by the Chous the acceptability to the whole empire of the Count of the West, afterwards known as King Wu, and particularly the high regard in which his father, King Wen, was held by the people, show that these two men were certainly not "wild" men or "barbarians."

As a matter of history, indeed, it appears that before the accession of his house to the throne of China, and before such a thing was even con-

²⁹ *Mencius*; one of the Chinese classics. Transl. in Legge's *Chinese Classics*, II, London, 1861-72. A later translation by the same author, 1875, London, in *The Life and Works of Mencius*. Book IV, Chap. 1: 1, Li Lou.

³⁰ *Ibid.*, Chap. 1: 2, Li Lou.

³¹ *Shu King*. Part I, Chap. 3.

templated, the ruler of the West became noted for his statesmanship. In his own territory, we are told, he formulated laws, introduced the tithing, provided for the care of widows, orphans and the aged, and made the government of his state so superior to that of the Middle Kingdom that the empire naturally turned to him. It is unfortunate that the early translators of the Chinese classics should have attempted to translate the proper name *I* giving it the meaning of "wild." They did not translate the names Jung, Miao, Man and Ti, the names of other tribes mentioned in the same books. It is true that the word *I* has come to mean "uncivilized" or "barbarous," but it seems quite evident that it could not have had that meaning anciently. The writers of the Chou Dynasty would not have used an offensive epithet to describe the ancestors of their ruler and the tribe to which he belonged. Yet these are the writers that tell us that Shun and Wen belonged to the *I*. Mencius, who lived during the Chou Dynasty, looked up with reverence to its founder whom he regarded as one of the civilizers of his race. Dr. Legge, himself, who is chiefly responsible for the translation of the term, found it at times inconvenient and at such times used it as it should always have been used as a proper name. In the *Tribute of Yu* he translates a passage as follows:

"The wild tribes about the Huai brought oyster pearls and fish and baskets full of deep azure and other silken fabrics, checkered and pure white."²²

What the Chinese writer really said was:

"The *I* people of the Huai region brought oyster pearls and fish and baskets filled with silks of deep azure hue, checkered and pure white."

Wild people do not as a rule make fine silk fabrics. When in the same work he speaks of the Miao and the Man he does not feel called upon to translate these proper names.

In another passage, where he describes the division of the territory of China among the various peoples, he finds it incongruous to describe that which was assigned to the *I* as "the territory of the wild tribes," for beyond them he was compelled to locate other tribes who were really less civilized than the *I*, and so he leaves the proper name, *I*, untranslated. In a later translation of a portion of the *Shu King* he is compelled to leave the proper name untranslated in order to avoid misunderstanding. The passage reads:

²² *Shu King*, Part III, Book 1: 5.

"After the conquest of the Shang, the way being open to the nine tribes of the *I* and the eight of the Man, the western tribe of Lu sent as tribute some of their hounds."³³

Thus, then, there were nine different tribes of people called the *I*. Some of them no doubt were more civilized than others and all were probably Chinese tribes, related one to another and heirs of the same culture. Among the *I* were the Shans, who, as we have already seen, are related to the Chinese.

The *I* are represented in the written language by a combination of two characters—"great" and "bow." The Jung on the west were represented by an ideogram composed of the characters for lance (or spear) and scale armor. The one tribe might very well have been called the "Long Bows" and the other the "Mailed Tribe." There is nothing in either character which requires it to be translated as "wild" or "barbarous." As a matter of fact the Chinese have been accustomed, even in very recent years, to designate all foreigners as *I*, which was commonly but not entirely properly translated "barbarians." Europeans and Americans were so styled until provision was made in our treaties forbidding the practice.

Mr. Kingsmill,³⁴ speaking of the origin of the Chous, is of the opinion that they were of the Aryan race. This is seriously open to question. There are, it is true, some Aryan elements to be found in the population of western China. Père Richard, in his *Comprehensive Geograph of China*, says of the Lolos:

"They are Indo-European or Aryan—white-skinned, hook-nosed, brown-haired and blue or gray-eyed. Their eyes are not almond shaped. They have no affinity with the Chinese in language, customs or character."³⁵

He says, moreover, of the Chinese in the province of Szechuen, that they are mixed, that some of them are of the Mongol type and others of the Aryan; that many of them have blue or gray eyes and that some have brown hair.³⁶ But if the Chous were Aryan, they have failed to leave Aryan physical features on the Chinese of north China. Mr. Kingsmill, of course, does not claim that the masses of the Chinese are of Aryan origin. His reasons for claiming an Aryan origin for the Chous are briefly (1) that the cult is Aryan—worship of ancestors; but

³³ *Shu King*, Part V, Book 5: 1.

³⁴ *J. China Branch R.A.S.*, Shanghai, xxiv, No. 2, 3.

³⁵ Père Richard. *o.c.*, 342.

³⁶ *Ibid.*, 112.

that is found among all races. (2) That the family law is Aryan.³⁷ There are striking resemblances between the family law of the Romans and that of the Chinese, also between the family law of Hammurabi and that of China, but this may have other explanation than that of a common racial origin. (3) That the fundamentals of the Chinese language are essentially Aryan. This is difficult to admit. Kingsmill seeks to explain how a polysyllabic language could become monosyllabic by illustration from the changes which have taken place in English, but the explanation is not very satisfactory.³⁸ (4) That certain astronomical data found among the ancient Chinese are identical with other data found among peoples that are recognized as Aryan. He declares, for instance, that the twenty-eight lunar mansions of the Chinese, which existed in very ancient times, are identical with a similar division found in India and Persia, and that this division originated prior to the Aryan dispersal. The cycle of sixty, according to Mr. Kingsmill, by which the Chinese reckon time, was known in ancient Babylon. Five revolutions of Jupiter around the sun completed the cycle, so that Jupiter in China was and is the year star.³⁹

But, granting that Mr. Kingsmill's claims as to the Aryan origin of the culture of the Chous are established, this would not prove that the Chous, themselves, were Aryan. Neither, of course, would cultural connection with western Asia prove that the race originated there. At most it would create a presumption in favor of such an origin. If, however, there should appear to be other sound reasons for advocating a western origin for the Chinese race, similarity of culture might reasonably be expected, and the proved existence of such similarity would add weight to the argument in support of race relationship. It is for this reason, no doubt, joined with that of our very defective anthropological knowledge of the Chinese, that those who believe in the western origin of the Chinese devote so much attention to the discussion of the subject of the origin of their civilization.

Now, there are, as I believe, other reasons than that of a cultural connection with western Asia for the notion that the Chinese came from the west. One of these is that Chinese early traditions seem to indicate that the birthplace and childhood home of the race was far away to the northwest of the land which afterwards came to be known as China. In this statement I find myself contradicting the assertions of Dr.

³⁷ *J. China Branch R. A. S.*, Shanghai, xxxi, No. 1, 1896-97, 64.

³⁸ *J. China Branch R. A. S.*, Shanghai, xxxi, No. 1, 1896-97, 63.

³⁹ *Ibid.*, xxxii, 20.

Hirth and others, who seem to hold that Chinese tradition assumes the race to have been fixed in its present habitation from time immemorial. I believe they are mistaken in such opinion.

Some European scholars think they see in the Tribute of Yu, one of the sections of the Chinese Classic of History, evidence of a western origin of the race. This work, which is regarded by the Chinese as describing the labors of the Great Yu in reclaiming the land from the overwhelming floods, about 2278 B.C., dates in reality from the period of the Chou Dynasty, subsequent to 1122 B.C., and preserves a geographical and statistical description of the alleged nine provinces of the empire as ruled by Yu the Great. It is, of course, highly improbable that Yu ruled over so extensive a territory. The description is remarkable, however, in that it includes a region which was not a portion of the empire under the Chou Dynasty and had not been under the preceding dynasty,⁴⁰ a region covering portions of the provinces of Szechuen, Shensi, and Kansu, which could only have been ruled by the Chinese in a very early period when the tribes were located far to the west of their later home. Biot, the French savant, found in the Tribute of Yu a history of the progressive extension of a great Chinese colony. Von Richthofen thought he found in it indications of the line of march taken by the Chinese as they came from the west. Prof. Edouard Chavannes fails to see anything of the sort and says:

"For our part, although profiting by all the excellent work of our predecessors, we do not find in the Tribute of Yu any trace of the pretended migration of the Chinese from the west towards the east."⁴¹

Nevertheless there seems to be good reason to accept von Richthofen's judgment in this matter.

We have in the Tribute of Yu a collection of geographical and statistical data concerning various portions of the empire, gathered in all probability not in any one period but compiled from ancient records. The description mentions the principal mountains and rivers, classifies the soil according to appearance and fertility, and states the revenue in kind from each province. This revenue included the spoils of the chase and the output of the mines as well as the produce of the fields. In this, as has just been stated, there was given an account of a vast region,

⁴⁰ *The Shu King*, a Chinese work, "The Classic of History." Transl. in Legge's (J.), *Chinese Classics*, III, London, 1861-72, Bk. 1: 9.

⁴¹ *Les Mémoires Historiques de Se-ma Ts'ien*; traduits et annotés par Edouard Chavannes. I, Paris, 1897, 102-103.

known then as Liang Chou, lying to the east and north of what we today call Tibet, which had not been a part of the empire for at least a thousand years, perhaps two thousand years, preceding the period in which the record was compiled. Dr. Legge says of it that during the Shang and Chou Dynasties "the greater part of it was considered as wild savage territory, beyond the limits of the Middle Kingdom."⁴² It lay, indeed, to the southwest of Mount Hua, which was the Western Mountain of the time of Yao and Shun (2307-2208 B.C.), that is to say, it marked the western boundary of the empire at that time. The data concerning this region, then, must have been preserved from a time prior to 2300 B.C., probably incised in primitive ideograms on bamboo tablets, and would seem to bear witness to an ancient occupation of that district by the Chinese people. If so, the whole nation must have later abandoned it, for in the time of Yao we find the kingdom according to the received tradition covering but a small territory east and north of the southern bend of the Yellow River.

This inference is supported by other traditions transmitted from ancient times. Some of these relate to the Emperor Huang Ti, i.e., the Yellow Emperor, who is said to have reigned about 2697 B.C.

While the *Shu King*, or Classic of History, begins its record with the reign of Yao, 2356 B.C., Sze-ma Ch'ien, who is called the Herodotus of China, commences his monumental work, the *Shih Chi*, with that of Huang Ti, or about 2700 B. C. The latter's name was Hsuan Yuan, "Huang Ti" being simply his title. One tradition declares that he was born in the prefecture of Kai-feng, in Honan (about 250 miles east of the southern bend of the Yellow River). Another, which seems to be more reliable, places his birth in Ch'in Chou, Kansu, about 600 miles west of Kai-feng, near the headwaters of the Wei River. I have said that this is the more reliable tradition; I should probably have done better to say "less inaccurate," for while several traditions associate the name of Huang Ti with the province of Kansu, he was perhaps born beyond the western boundary of China. In the *Mu T'ien Tzu Chuang* there is an account of a visit paid by King Mu to the Wang Mu of the West (commonly translated "the Western Fairy Queen") in 986 B.C. It is said that on the fifty-third day of his journey he passed a former palace of Huang Ti on the Red River in Kansu,⁴³ a thousand miles northwest of the traditional capital of the Emperor Yao.

⁴² *The Shu-King*, Bk. 1: 9.

⁴³ de Lacouperie (Terrien) *Western Origin of the Early Chinese Civilization*. London, 1894, 265; also Chavannes, *Les Mémoires Historiques*, v, 1905, 482.

But it is in the *Shan Hai King* more than in any other work that we find legends relating to the early history of the Chinese people. It is of about the same age as the Tribute of Yu, mentioned above, and is as old as the early years of the Chou Dynasty, that is to say, it was written not later than 1122 B.C., and may have been written much earlier. It contains the earliest traditions of the race. The book has been much discredited because of the many marvels of which it speaks, but it is not surprising to find a work dating from the twelfth century B.C. containing tales of the marvelous, and the existence of such tales ought not to be allowed to lessen the value of the evidence which the work gives to the circulation at that early period of certain traditions regarding the regions occupied by the Chinese forefathers.

Wylie in his *Notes on Chinese Literature* says of it:

"This . . . compilation has long been looked upon with distrust; but some scholars of great ability have recently investigated its contents, and come to the conclusion that it is at least as old as the Chow Dynasty, and probably of date even anterior to that period."⁴⁴

In a region beyond the Western Sea and in a "corner of the wilderness beyond the North-western Sea" are located many of the incidents related in the legends of the founders of the Chinese nation. Some consider the Kokonor to be the Western Sea, and this seems reasonable; others think the Aral is meant, and others still the Caspian.⁴⁵ It is in that far region toward central Asia that it locates the wonder working of Fu-hsi and his sister, Nu-Kua;⁴⁶ there that human society was first established, there that the people were taught to plow and sow by Shen-nung,⁴⁷ and there, we are told, "on the north side of Mount Ch'iung one does not dare to shoot an arrow towards the west, because there is the grave mound of Hsuan-yuan, i.e., the Emperor, Huang Ti." This is called the land of Hsuan-yuan.⁴⁸ This would locate the cradle of the race at least as far west as Chinese Turkestan, and might require it to be placed much farther west in central Asia. Quite a number of references are made to Huang Ti and his grandsons in connection with

⁴⁴ I, 35.

⁴⁵ Giles (H. A.) *A Chinese-English Dictionary*, pub. by Bernard Quaritch, Lond., Shanghai, etc. 1892; under *Hai*.

⁴⁶ *The Shan Hai King*, or "Classic of the Hills and Seas," a Chinese work of great antiquity. No transl. has come under the notice of the writer, Bk. 16.

⁴⁷ Giles' *Chinese-English Dictionary*, under "*Hai*."

⁴⁸ *Shan Hai King*, Bk. 7.

these distant regions.⁴⁹ All this, of course, is legendary. These tales are nothing more than oral traditions handed down from generation to generation and at last about the twelfth century B.C. committed to writing, but they seem to establish beyond question that at that early period the Chinese story-tellers looked to the northwest for the home of their heroes and demigods. The very fact that the *Shan Hai King*, or Classics of Mountains and Seas, which purports to tell all about the mountains and seas of China and neighboring countries, devotes such a disproportionate amount of space to the northwestern regions, is of itself of considerable significance.

The tales themselves, strange and incredible as they are, bear witness to the importance which those far-away regions had in the estimate of those dwellers in the lower valley of the Yellow River. Fancy grew busy with these race memories. There were lands up there among the "moving sands"⁵⁰ and beyond the "western desert,"⁵¹ inhabited by curious creatures, half human, half animal; creatures with human heads and serpent bodies.⁵² There were men whose eyes were in their breasts and mouths at their navels.⁵³ There was also a kingdom of women,⁵⁴ and not far away another of husbands⁵⁵—echoes, almost, of similar stories told by Hérodotus and concerning the Amazons, Scyths and tribes of northern Russia and northwestern Asia. There was also somewhere in that region a land of "white men."⁵⁶ There was a country where men are not counted old under 800 years of age.⁵⁷ There, too, is the paradise of the Western Royal Mother or Fairy Queen.⁵⁸ Originally this was nothing more than a description of some western land whose name the Chinese attempted to transliterate by using characters pronounced "wang-mu," but since they chose to use the "wang" meaning "royal" and the "mu" meaning "mother," fancy began to weave beautiful legends about a fairy queen, and so we are permitted to read of the happy subjects of that queen who feed upon the eggs of the mythical bird, the phoenix, and drink sweet dew, and

⁴⁹ Ibid., Bks. 7 and 16.

⁵⁰ Ibid., Bk. 16.

⁵¹ Ibid., Bk. 16.

⁵² Ibid., Commentary.

⁵³ Ibid., Bk. 7.

⁵⁴ Ibid., Bks. 7 and 16.

⁵⁵ Ibid., Bk. 7.

⁵⁶ Ibid.

⁵⁷ Ibid., Bk. 16.

⁵⁸ Ibid., Bks. 7 and 16, frequently.

whose every wish once uttered is immediately gratified.⁵⁹ We are told of the Lake of Gems and the Peach of Immortality,⁶⁰ and learn how a few favored monarchs have been permitted to visit that fairy queen and partake of the elixir of life. In other words, all the important myths and legends, all the earliest traditions of the Chinese, and all their oldest fairy tales speak of this wonderland beyond the Western Sea. Does not this of itself suggest that it is there that we should look for the childhood home of this ancient people?

This theory, that the Chinese originated in part at least in central Asia, accords very well with what little we know of the movements of peoples in central and eastern Asia in ancient times. The dark-skinned, curly-headed aborigines of central and southern China were forced into the Indo-Chinese Peninsula by the pressure of other tribes moving upon them from the north. These ethnic movements not only followed the courses of the Brahmaputra and the Irrawaddy, but pushed down the valley of the Yellow River as well. The earliest immigrants into this valley were driven eastward by those coming later until, on reaching the coast, the current was deflected either to the north or the south. Little headway was made, however, toward the north or the northeast. There the Chinese met with strong resistance. Indeed, at times they have been driven back by incursions of Tartar hordes from that quarter. The line of least resistance was toward the south, and the tribes that were not absorbed by the incoming conquerors, as were the *I*, to which Shun belonged, were gradually pressed southward, as happened to the Miao and the Shans. This would seem to explain the movements of Huang Ti and other early leaders of the Chinese.

When we find the name of Huang Ti associated with a number of places in the far northwest and also with widely separated places in Kansu, and are told that subsequently, according to tradition, his capital was located near Hsuan-hua Fu,⁶¹ about 125 miles northwest of the site of the present city of Peking, we seem to be justified in assuming with Prof. Terrien de Lacouperie that Huang Ti was a leader of a band of immigrants. Such a migration would have taken place about 2700 B.C.

Some 350 years later, we find one of the successors of Huang Ti, the Emperor Yao, established on the north bank of the Yellow River,

⁵⁹ Ibid., Bk. 16.

⁶⁰ Ibid.

⁶¹ *Les Mémoires Historiques de Se-ma Ts'ien*, traduits et annotés par Edouard Chavannes, I, Paris, 1897, p. 29, note 2.

about 400 miles south of Hsuan-hua.⁶² Shun, who followed Yao upon the throne, evidently belonged to a tribe that had come east in an earlier migration and which had settled in what is now the promontory of Shantung. These two states, ruled by Yao and Shun, were eventually consolidated, as we have seen.

While Shun ruled the land a feudal lord, named Shang, came into prominence. His seat was far to the west of Shun's capital, in the valley of the Wei River, near the modern city of Hsi-an Fu,⁶³ in Shensi. His descendants, however, by some cause unknown to us, were made to migrate eastward on the south side of the Yellow River to the borders of modern Shantung, a distance of 400 or 500 miles from their old home, for when the Shangs in 1766 B.C. attacked and overthrew the Hsia Dynasty, it was from this latter place that they led their armies.

In the meantime new tribes had appeared upon the western horizon. The ancient seat of the Shangs had become the home of the Chous. In 1122 B.C. these newcomers in their turn made a bid for the mastery. Forming a federation of eight western tribes,⁶⁴ they attacked the Shangs and wrenched the empire from them. These indications, although they are few and faint, nevertheless seem to justify us in believing that in northern China there was anciently a steady movement of population from the west toward the east.

Perhaps the most ardent advocate of the western origin both of the civilization of the Chinese and of the race itself has up to the present been Prof. Terrien de Lacouperie. He was while he lived indefatigable in collecting from all quarters evidence bearing upon the problem. His presentation of the case, however, has not always been happy, and the theory has suffered somewhat in consequence. It is difficult at times to separate his facts from his guesses. Some of his identifications, such as that of Shennung with Sargon,⁶⁵ seem too fanciful for acceptance. His argument for an Elamite origin of the Chinese forefathers, who were said not to belong to the yellow race, and to have had blue eyes wanting in obliqueness, is not at all convincing.⁶⁶ There is, however, a great

⁶² The traditional capital of Yao was near P'ing-Yang Shansi. Legge casts doubt on the accuracy of this tradition. *Vide* preface to his translation of the *Shu King*, Part I, Canon of Yao.

⁶³ *Vide* Legge's Preface to his translation of the *Shu King*, Part IV, Bk. I, "The Speech of Thang."

⁶⁴ *Ibid.*, Part V, Bk. II, 1 and note.

⁶⁵ de Lacouperie, *o.c.*, 318 and note 1313 on 322.

⁶⁶ *Ibid.*, 318.

deal of valuable material brought to the knowledge of the student in his *Western Origin of Early Chinese Civilization*. He endeavors from the data collected to reconstruct the probable route of Huang Ti from ancient Elam to the Yellow River Valley.⁶⁷ Without accepting entirely his suggestions with respect to that assumed migration, we believe he is right in looking upon Huang Ti as the leader of a band of immigrants who first settled in southwest Kansu and afterwards moved to the mouth of the Wei River and thence to the vicinity of modern Hsuanhua Fu,⁶⁸ and to that extent the writer has adopted his views. We believe, too, that his argument is sound for the use of the phrase, "Bak Sing," as a tribal designation, the name in fact of the tribes led by Huang Ti into China and later gathered into a small state in southern Shansi.⁶⁹

These words in modern Pekingese are pronounced "pai hsing," and "po hsing," in Nankingese, "pe sing" or "be sing," and in Cantonese "pak sing" or "bak sing." Literally they mean "the hundred surnames." One of the textbooks studied in Chinese schools is called "the Pai Chia Hsing," or "The Hundred Family Surnames." The book, however, contains many more than a hundred surnames. There are several hundred, indeed, and altogether there are some thousands of surnames among the Chinese, and de Lacouperie's belief that the words were not intended to be taken in their ordinary meanings but constitute the name of a people seems well founded. In the oldest books of the Chinese these words are used to describe the subjects of the emperors. They are usually translated "the people," and to this day "the people" in China are known as the "pai hsing," or in Cantonese as the "pak sing." "The Bak Tribes" is in fact a very proper translation. De Lacouperie's theory is that the Bak tribes came from central or western Asia and left their name upon many places en route, such as Baku, Bactria, etc. This is decidedly uncertain, but perhaps not very unreasonable. We must bear in mind, however, that there were many migrations of related tribes both before and after the Baks. Among those that preceded were the *I* tribes, one of which we know as the Shan; while among those that followed we have the Chous, who in 1200 B.C. moving from the same general direction as the Baks brought with them into China a higher degree of culture than was possessed by their predecessors and introduced many new ideas, laws and inven-

⁶⁷ Ibid., 316-337.

⁶⁸ Ibid., 329 and note 1359 on 331.

⁶⁹ Ibid., 302-306.

tions. The Chous at first contended with the Baks as the latter had previously contended with the Ti and the Miao. Finally the Chous conquered and the Baks were amalgamated with them.

The acceptance of this theory of a central Asian origin for the Chinese people enables us to give a very satisfactory explanation of the striking similarity between the language of ancient China and that of the Sumerians and the still more striking similarity between the ideographic symbols of the two peoples.

Prof. C. J. Ball, Lecturer in Assyriology in Oxford University, called attention to this at the Ninth International Congress of Orientalists, held in London in September, 1892. At that time the ideograms with which the Chinese writing was compared were supposed to be Accadian. It has since been learned that there were two races in the Euphrates Valley in that ancient period, the Accadians and the Sumerians, and that the ideographic symbols belonged to the latter. In 1892, however, Professor Ball read a paper on "Accadian Affinities" in which he endeavored to show that a connection existed between the Chinese and the Accadian, which he called "the oldest of known languages." In this paper he said:⁷⁰

"Five thousand years before our era it (Accadia) possessed a system of writing which the earliest documents prove to have been of pictorial origin The earliest Accadian inscriptions, whose date can be fixed with some approach to certainty, are considerably later than the times of Naram-Sin and Sargon. The most important are those of Gudea, discovered at Tell-Loh by de Sarzec. The probable date of that sovereign is about 2,800 B.C. a date which curiously coincides with that of Fuh-hi, one of the traditional founders of Chinese civilization, and reputed inventor of the arts of writing, numbers and divination (2,852 B.C.). A glance at these venerable monuments at once reveals the fact that the writing out of which the cuneiform characters of Babylon, Assyria and other countries were developed was originally disposed in vertical columns exactly like the writing of China; and that the symbols which have been laid down on their sides in the derived script, must be raised again from left to right if we would gain a just conception of their original form and pictorial significance. . . . The purpose of this paper is to show that the progress of special inquiry must, if regard be had to facts and not to preconceptions, in the long run, convince the learned world of the truth of the theory that the Chinese writing had a western origin, and that the Chinese language is the nearest living representative of the ancient Accadian."

For the word "Accadian" in the above quotation we ought now to substitute "Sumerian."

⁷⁰ *Transactions Ninth International Congress Orientalists*, London, 1893, 677-678.

In a later work, published in 1913, entitled *Chinese and Sumerian*, Dr. Ball gives a list of 108 ideograms in Sumerian, with which he identifies certain old forms of Chinese. No one, it seems to me, who is unbiased, can study these two lists carefully without being convinced that they have a common origin. In the same volume Dr. Ball publishes a vocabulary of more than a thousand words from the Sumerian which he shows to be substantially identical in sounds and meanings with the Chinese equivalents. It is, of course, understood that after a separation of ages even words that have had a common origin will have become modified in pronunciation and that in some cases definitions also will be changed. But the changes which have taken place in these words of the Sumerian and Chinese languages, of supposedly common origin, are, or seem to be, in accord with philological laws, and just such as have been found taking place in other languages.

The proposed derivation of the Chinese written language from the ancient Sumerian is, however, emphatically rejected by Mr. E. H. Parker in his philological essay, prefixed to Giles's *Chinese-English Dictionary*. He says:

"So far as I can see, there is no evidence to show that the Chinese script was invented or developed otherwise than from within, just so much so as the Egyptian script; and nothing worthy of serious consideration has been adduced to connect it with Egyptian, Akkadian, or any other early form of writing."⁷¹

Dr. Hirth says of the suggested connection of the Chinese people with those of western Asia:

"Anthropological arguments seem to contradict the idea of any connection with Babylonians, Egyptians, Assyrians, or Indians. The earliest hieroglyphics of the Chinese ascribed by them to the Shang Dynasty (second millenium B.C.) betray the Mongol character of the nation that invented them by the decided obliquity of the human eye wherever it appears in an ideograph. In a pair of eyes as shown in the most ancient pictorial or sculptural representations in the West, the four corners may be connected by a horizontal straight line whereas lines drawn through the eyes of one of the oldest Chinese hieroglyphics cross each other at a sharp angle . . . This does not seem to speak for racial consanguinity any more than the well-known curled heads and bearded faces of Assyrian sculptures as compared to the straight haired and almost beardless Chinese."⁷²

On the other hand L. W. King in his *History of Sumer and Akkad* says:

⁷¹ Giles' Dictionary, Introd., xix.

⁷² *Encycl. Brit.*, 11th ed., vi, 191.

"The racial affinity of the Sumerians is problematical. The *obliquely-set eyes* of figures in early reliefs suggested the theory of a Mongol origin and the Chinese origin of Sumerian roots and the Cuneiform character."⁷³

He adds that this "is too improbable to need detailed refutation." He shows his misunderstanding of the theory, however, which does not propose a Chinese origin for cuneiform but rather a Sumerian origin for the Chinese character. But his statement that figures in early Accadian sculptures have obliquely-set eyes at least removes the objection of Dr. Hirth that the obliquely-set eyes of the Chinese make consanguinity with the Accadians impossible.

It is not necessary, of course, to assume the identity of the two peoples in order to account for similarity of language, but the existence of a Turanian element in the population of the Euphrates Valley in ancient times renders it highly probable that there may be a relationship. It does seem possible, at any rate, that the two languages may have had a related origin and that the two people also may be akin. Assuming this for the moment to be true, where shall we look for the common source of the two languages and the probable common home of the two peoples? And what could have occurred to cause such a wide separation?

Pumpelly's *Explorations in Turkestan*, being an account of his expedition to that region in 1903 and 1904, and the account of his second expedition in 1904, together with the facts adduced in Ellsworth Huntington's *Pulse of Asia*, bring to our notice important facts with regard to great climatic changes that have taken place in central Asia and that have converted a great inland sea and a region of moist climate and fertile soil into an arid desert. The explorations of Aurel Stein farther east have uncovered the buried cities of Khotan. The whole region is described as including six basins, covering a vast territory, 3,000 miles from east to west and 1,600 from north to south.⁷⁴

The earliest remains unearthed at Anau, on the oasis of Merv, by the Pumpelly Expedition, according to the estimate of Ulrich Duerst of the University of Berne, are put at 8250 B.C.⁷⁵

Professor Pumpelly believes that the oases of central Asia are the fountain of Western Asiatic culture.⁷⁶ He might have added that even more probably they are the fountain of eastern Asiatic culture. I think that the evidence will support this statement.

⁷³ King (L. W.) *A History of Sumer and Akkad*. Lond., 1910, 54.

⁷⁴ Huntington (E.) *The Pulse of Asia*. Boston and N. Y., 1907, 356.

⁷⁵ Pumpelly (R.) *Explorations in Turkestan, Expedition of 1904*. Carnegie Inst. of Wash., publ. 73, 1908, 437.

⁷⁶ *Ibid.*, 357.

The region, so we are told, was isolated from Europe, though this seems doubtful, and from Africa from the glacial period onward, and the culture of the people there was evolved in complete independence. But owing to climatic changes the people eventually were compelled to emigrate. This we know in fact has occurred in recent times and is still going on. We have a number of Chinese accounts of attempts at various times to colonize certain of these regions which afterwards had to be abandoned.⁷⁷ From these basins of central Asia men have been forced by the progressive desiccation of the region to migrate at different periods from one place after another. These people moved, some to the west, some to the north, others to the east. Now we learn from Jastrow's *Civilization of Babylonia and Assyria* that the Sumerians very possibly entered the Euphrates Valley from the mountainous regions east or northeast of Babylonia.⁷⁸ We learn still more. Here is what Jastrow says upon the question: "Who were the Sumerians?"

"We know that they were not Semites; their features as depicted on the monuments reveal a Turanian type, but the term, Turanian, is too vague to furnish a definite clue."⁷⁹

It does not seem improbable, then, that the changes taking place in central Asia which were driving the inhabitants of that region to seek homes elsewhere may have been the direct or indirect cause that forced the Sumerians to move into the valley of the Euphrates.

We are told, moreover, by Jastrow, in his *Hebrew and Babylonian Traditions*⁸⁰ that the Sumerians were more highly civilized than the Semites whom they met in that valley; that the Sumerians conquered these Semites and that the Sumerian script became the written language of the conquered and the origin of the cuneiform. He tells us that the early population of the Euphrates Valley was mixed in character, that by the side of the Semites we find a Turanian race clearly depicted on the monuments and demarcated by their physiognomies and by differences of costume from the Semitic population.⁸¹ In his

⁷⁷ Huntington, 219; 266-267.

⁷⁸ Jastrow (M.) *The Civilization of Babylonia and Assyria*, Phil. and Lond., 1915, 106-107. See also *Sumer and Akkad.*, by L. W. King, Appendix I.

⁷⁹ *Ibid.*, 106.

⁸⁰ *Ibid.*, 106.

⁸¹ *Hebrew and Babylonian Traditions*, by Morris Jastrow, N. Y., 1914, 9-10; also King's *Sumer and Akkad*, 348; also Jastrow's *Civilization of Babylonia and Assyria*, 106.

later work, "The Civilization of Babylonia and Assyria" (p. 107), he admits that there is some doubt whether the Sumerians found the Semites already in Babylonia when they arrived there, but that the evidence favors this view and indicates that when the Sumerians swept down upon the Semites they imposed upon them such culture as they had brought with them.

We have, then, the facts that various Chinese tribes appear to have come in to what is now China from some region to the northwest of that country, and that the Sumerians appear to have come into the Euphrates Valley from some place to the northeast of Babylonia; that the Sumerians were apparently of the Turanian race, and that their language and their script are strikingly like those of the ancient Chinese; and that extensive changes in the climate of Central Asia have driven out at different periods great numbers of the inhabitants who have migrated in various directions. It does not seem at all improbable then that the Chinese forefathers and the ancestors of the Sumerians may have been related and may have migrated from neighboring regions, the Chinese toward the east and the Sumerians toward the west.

There remain many mounds in Central Asia which have never been explored. Is it too much to hope that in the not far distant future explorations there may uncover inscriptions in a primitive hieroglyphic writing which will prove to be the parent, both of the Sumerian and of the Chinese; and that other conclusive evidence, the foremost place among which may not unlikely be reserved to the skeletal remains, may establish a definite relationship between the two peoples?

Aside or together with the great problem of the origin of the Chinese range themselves the scarcely less important anthropological problems of the possible presence, quantity and derivation of "white" blood in the Chinese; and of the relation to the Chinese of those highly interesting tribes which skirt much of the northern and western borders of the Chinese territory and which bear such close physical resemblances to the American Indians.

NOTES ON THE CEPHALIC INDEX OF RUSSIAN JEWS IN BOSTON

C. E. GUTHE

INTRODUCTION

The material upon which this article is based was collected between May, 1915, and January, 1917, under the direction of Dr. E. A. Hooton, of the Peabody Museum. The duties coincident with studies in the Graduate Department at Harvard made it possible to devote only a few hours at a time to the collection of material.

Since the work was done without any aid, progress was slow. The attempt was made to reach the Jews through their clubs. Several of these, particularly the Civic Service House, the Elizabeth Peabody House, and the West End House, were of great assistance. Through these clubs, however, only the younger people were available. It was hoped that whole families could be studied. The attempt was made to use boys acquainted with the neighborhoods as guides and interpreters, but lack of interest and perception on their part made them more of a hindrance than a help. In going alone from house to house, it was found that the parents were over-suspicious, especially because of the war, and inability to speak their language complicated matters.

Consequently, the goal set when the work began was never reached. At length, because of moving away from Boston, the work was stopped, and it was decided to work up the material already obtained.

SECURING THE DATA

The subjects were taken only from among the Russian Jews who were born in Russia or who were born in this country of Russian parents. All the work was done in the crowded north and west ends of Boston, which are inhabited almost entirely by Russian Jews.

On each subject, only the head was considered. Special blanks were used, which gave the name and address of the subject, the time and place of birth, and, if born in Russia, the date of immigration. Spaces were provided for the same data concerning the father and mother of the subject, but it was found that in most cases this latter information was not known. Several measurements were taken on the head and face,

and a series of observations was also recorded. This article concerns itself only with two measurements, the length and breadth of the head. These two measurements were taken according to the generally accepted method: the maximum antero-posterior diameter of the head (glabella-occipital), and the horizontal diameter of the head at the greatest width, somewhere just behind the ears, and at right angles to the sagittal plane.

The measurements were taken in contact with the skin, but without exerting undue pressure. The readings were all taken while the calipers were still in position.

The same instruments were used throughout the work, and the readings were all taken to the nearest millimeter. All the measurements were taken by the writer. This does away, to a great extent, with the personal equation, which would arise in case two or more observers had participated in the work. Infrequent repetitions of measurements showed an occasional difference in the readings of 1 millimeter. Unfortunately no careful record was kept of these variations, which would show the error which might be expected in the measurements.

The year of birth and the year of immigration were recorded. The date of birth was not noted, and, as a result, in working out the ages of the subjects, the year of birth was subtracted from the year of the observation, obviously allowing a greater latitude than the usual custom of giving the age to the nearest birthday. In regard to the place of birth, only the country was taken. More detailed information about the birthplace was deemed unnecessary at the time the measurements were made.

The blanks, as they were filled out, were filed away according to name and address. This was done in order to guard against duplication, and also to keep the families together. These blanks were not rearranged according to various headings used in the statistical treatment until the collection of material had been completed. As a result, the trend of the cephalic index was unknown until all the measurements had been made, and therefore the possibility of the wish controlling the reading was minimized.

STATISTICAL TREATMENT

The number of subjects, 314 in all, does not allow any very detailed treatment of the various relations which are possible in such a work as this. This treatment is further hampered by lack of data. In many cases the subject could not give the information desired.

The material obtained in regard to the various phases will be given, but in several cases it will be of little real value. Dr. Boas, in his work,¹ dealt with the relation between the indices of the American child and its Russian mother. Unfortunately, in the majority of those families which were measured, all the children were born in Russia. Table 1 contains the cephalic index of five mothers and their children.

By the use of this material and that obtained from those children born in America who knew the year of their mother's immigration, a series (table 2) was obtained giving the relation between the head form of the American-born Jew and the length of time the mother had been in this country before the birth of the child. The means of the seven columns have been given by way of summary. It should be noticed that the means of the two best series, namely, those of the males born

TABLE 1. CEPHALIC INDEX

RUSSIAN MOTHER	AMERICAN CHILD
80	80
82	86
82	86
84	88
88	82
88	88
89	84

under and over seven years after the arrival of the mother, agree, in general, with Dr. Boas' results.²

Another classification which utilizes only a part of the subjects measured is that of arranging the cephalic indices of those subjects born in Russia, according to the year of immigration (table 3). The number of cases does not warrant any conclusion in regard to the possible change of the head form during any period. The table brings out quite clearly, however, that the material was obtained principally from Jews who had immigrated from Russia since 1900. The 15 years from 1899 through 1913 contain over 90 per cent of the cases.

It is necessary now to consider the material as a whole. The data collected may be divided into two large groups, namely, the indices of Russian-born Jews, and those of American-born Jews. Each of these

¹ Franz Boas, *Changes in Bodily Form of Descendants of Immigrants*. Columbia University Press, N. Y., 1912.

² Boas, op. cit., p. 59.

TABLE 2. CEPHALIC INDEX OF AMERICAN-BORN JEWS IN RELATION TO LENGTH OF MOTHER'S RESIDENCE IN THIS COUNTRY

INDEX	LESS THAN 7 YEARS			MORE THAN 7 YEARS			TOTAL
	Male	Female	Total	Male	Female	Total	
76	—	—	—	1	—	1	1
77	—	—	—	—	—	—	—
78	—	—	—	3	—	3	3
79	2	—	2	3	—	3	5
80	2	—	2	4	—	4	6
81	4	2	6	1	—	1	7
82	3	2	5	—	3	3	8
83	—	2	2	3	—	3	5
84	2	1	3	2	—	2	5
85	2	1	3	—	—	—	3
86	—	2	2	1	1	2	4
87	—	—	—	1	1	2	2
88	1	—	1	1	2	3	4
89	—	—	—	—	—	—	—
90	—	—	—	—	1	1	1
Total.....	16	10	26	20	8	28	54
Mean.....	82.1	83.3	82.4	81.3	85.6	82.5	82.6

TABLE 3. CEPHALIC INDEX OF RUSSIAN-BORN JEWS ARRANGED ACCORDING TO YEAR OF IMMIGRATION

YEAR	NO.	RANGE	MEAN	YEAR	NO.	RANGE	MEAN
1886	1	80	80.0	1904	12	81-89	83.1
1888	1	78	78.0	1905	15	75-88	83.3
1891	1	88	88.0	1906	10	80-88	84.3
1893	1	86	86.0	1907	15	76-87	82.9
1894	1	85	85.0	1908	15	77-90	81.9
1895	1	82	82.0	1909	16	77-89	83.2
1896	2	81-83	82.0	1910	4	82-86	83.5
1897	1	83	83.0	1911	7	78-86	81.6
1898	2	81-88	84.5	1912	20	75-91	82.4
1899	7	84-88	85.7	1913	15	77-88	82.9
1900	10	77-86	82.6	1914	3	82-83	82.3
1901	5	80-86	83.4				
1902	5	75-88	81.2				
1903	15	80-89	83.7	Total.	185	75-91	83.08

TABLE 4. CEPHALIC INDEX OF RUSSIAN-BORN JEWS GROUPED ACCORDING TO AGE AND SEX

MALES BORN IN RUSSIA				FEMALES BORN IN RUSSIA			
Age	No.	Range	Mean	Age	No.	Range	Mean
				7	1	83	83.0
				9	2	88-91	89.5
10	1	85	85.0				
11	5	81-87	84.6	11	1	80	80.0
12	3	83-88	85.7	12	2	89	89.0
13	2	85-86	85.5	13	3	84-86	85.5
14	5	81-88	85.5				
15	11	75-89	82.9	15	1	84	84.0
16	22	77-86	82.2	16	1	77	77.0
17	7	80-85	81.7	17	6	82-90	84.8
18	22	76-89	83.0	18	7	79-89	85.4
19	13	78-86	81.8	19	1	88	88.0
20	8	75-85	81.4	20	4	84-86	85.0
21	9	77-88	82.4	21	2	82-88	85.0
22	7	80-88	83.0	22	2	82-88	85.0
23	4	79-86	81.2	23	1	78	78.0
24	2	77-83	80.0				
25	1	85	85.0				
27	2	80-83	81.5				
28	1	81	81.0	28	1	82	82.0
29	2	75-86	80.5				
31	1	78	78.0				
32	2	83	83.0				
33	2	82-84	83.0	33	1	89	89.0
34	1	82	82.0				
				37	2	80-84	82.0
				38	1	85	85.0
				39	1	88	88.0
				40	1	82	82.0
41	1	81	81.0	42	1	85	85.0
43	1	82	82.0	43	2	80-88	84.0
				44	1	84	84.0
				45	1	83	83.0
46	3	78-86	82.7	46	1	84	84.0
				48	1	86	86.0
50	1	81	81.0				
	139	75-89	82.56		48	77-91	84.77

groups may be divided according to sex, and finally the measurements can be grouped according to age of the subject, and cephalic indices. In tables 4 and 5 this has been done. The material as presented here brings out the fact that the bulk of the data was obtained from individuals between the ages of 12 and 23 years. The arrangement shows, also, the absence of sufficient material in any one group of years to warrant the drawing of conclusions.

TABLE 5. CEPHALIC INDEX OF AMERICAN-BORN JEWS GROUPED ACCORDING TO AGE AND SEX

MALES BORN IN AMERICA				FEMALES BORN IN AMERICA			
Age	No.	Range	Mean	Age	No.	Range	Mean
2	1	86	86.0	3	1	86	86.0
7	2	80-88	84.0	8	4	82-85	83.5
8	3	81-85	83.0	10	1	85	85.0
10	5	77-84	80.4	11	2	80-86	83.0
11	6	79-92	84.3	12	3	81-90	84.3
12	4	74-89	81.8	13	8	77-88	81.5
13	6	82-87	84.3	14	1	83	83.0
14	9	79-85	81.8	15	2	82-85	83.5
15	6	77-88	81.2	17	2	81-82	81.5
16	10	75-84	80.3	18	1	81	81.0
17	9	74-87	80.8	19	1	83	83.0
18	8	78-85	81.8	20	2	82-88	85.0
19	7	79-87	83.4	22	2	82-87	84.5
20	7	73-85	80.3	23	2	86	86.0
21	5	80-88	82.2				
22	4	78-83	80.8				
24	1	79	79.0				
26	1	76	76.0				
30	1	83	83.0				
	95	73-92	81.79		32	77-90	83.25

If the age grouping is omitted, and the material is classified only according to place of birth and sex, four principal groups result which can be studied. This classification combined with one according to the indices is shown in table 6. In addition to these four groups are three more resulting from their combinations, namely, those containing all measurements of subjects born in Russia, all those of American birth, and finally, one group containing all the data obtained. These seven

groups are given graphically in three frequency polygons (figs. 1, 2, 3). The cephalic indices range from 73 to 92, a range 2 points smaller than that given by Dr. Boas.³ The range of the females of both classes is smaller, which is true also of the number of cases.

TABLE 6. CEPHALIC INDEX OF JEWS CLASSIFIED ACCORDING TO PLACE OF BIRTH AND SEX

INDEX	RUSSIAN			AMERICAN			TOTALS
	Male	Female	Both	Male	Female	Both	
73				1		1	1
74				2		2	2
75	3		3	1		1	4
76	2		2	1		1	3
77	6	1	7	2	1	3	10
78	7	1	8	6	2	8	16
79	3	1	4	11	1	12	16
80	12	3	15	10	1	11	26
81	15		15	14	3	17	32
82	18	5	23	8	6	14	37
83	20	4	24	12	4	16	40
84	13	7	20	8	2	10	30
85	12	7	19	6	4	10	29
86	15	5	20	3	4	7	27
87	5	1	6	4	1	5	11
88	6	7	13	4	2	6	19
89	2	4	6	1		1	7
90		1	1		1	1	2
91		1	1				1
92				1		1	1
	139	48	187	95	32	127	314

The arithmetic mean and the standard deviation for all seven groups are given in table 7, together with the standard error of each. The standard error of the arithmetic mean was obtained by using the formula

$$Em = \pm \frac{\sigma}{\sqrt{n}}$$

The standard error of the standard deviation was obtained by substituting in

$$Ed = \pm \frac{\sigma}{\sqrt{2n}}$$

³ Boas, Changes in the Bodily Form of Descendants of Immigrants. *American Anthropologist*, n. s. 14. p. 560.

In both the American-born Jews and the Russian-born Jews, the mean for the females exceeds that for the males. This agrees, in general, with Dr. Boas' results.⁴

The fact that the standard error is larger in the case of the females is obviously due to the fewer number of cases in those columns. The

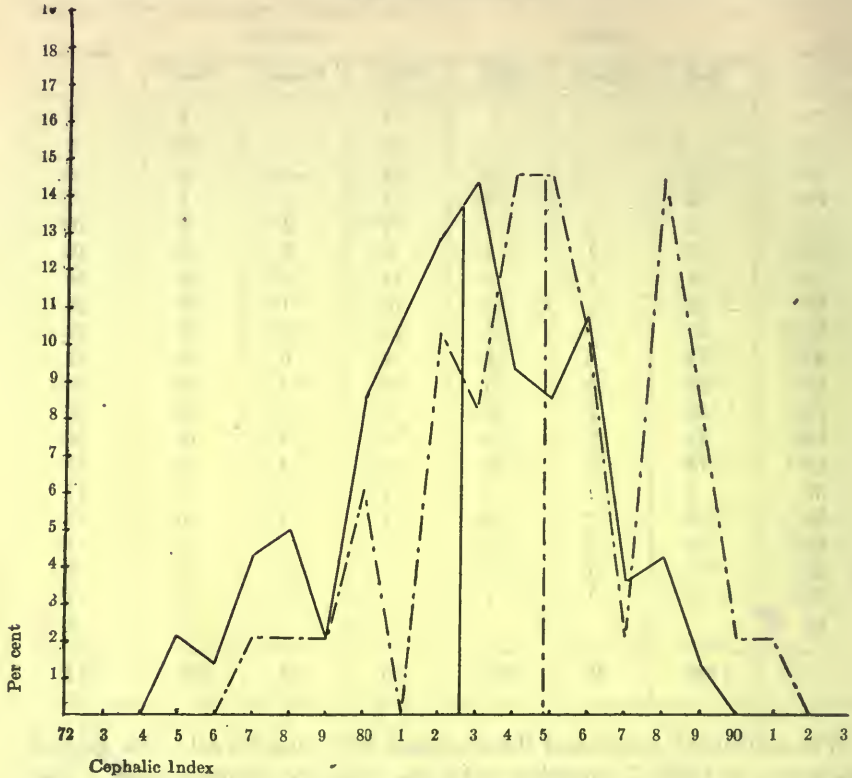


FIG. 1. JEWS BORN IN RUSSIA.

Male —————

Female - - - - -

standard deviations for all the American-born Jews and all the Russian-born Jews are larger, in both cases, than those of the columns of males and females, due to the combination of these two factors. The standard deviation for the complete series is still larger, for the same reason.

⁴ Boas, Columbia University Press, 1912, pp. 18, 19.

In table 8 the arithmetic means and the standard deviations of the four principal groups and their two combinations are compared, giving the differences between them. It is noteworthy that the differences between the means of the groups compared in all three cases exceed the sum of the standard errors of the means of these groups, in spite of

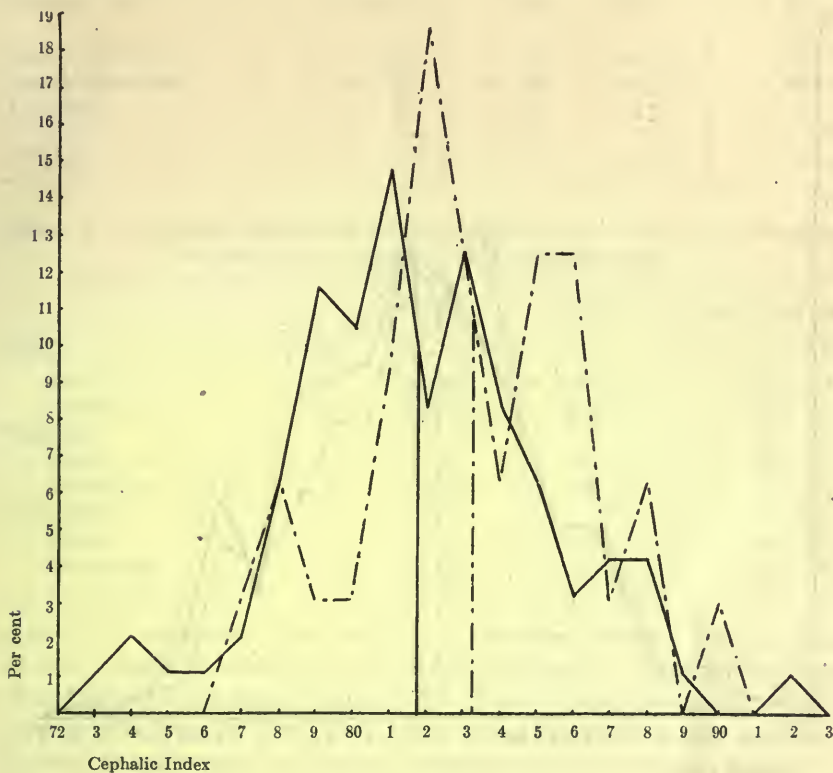


FIG. 2. JEWS BORN IN AMERICA.

Male —————

Female - - - - -

the small number of cases in each group, a condition which increases the errors. This excess is for the males 0.16, for the females 0.52, and for the combined groups 0.43 of a point. This fact leads to the conclusion that there is probably some factor other than accident influencing the cephalic indices of the groups, although the comparatively small

number of cases tends to weaken this conclusion rather than strengthen it. This condition does, however, agree with that found by Dr. Boas in New York. His results show that the cephalic indices of American-born Jews, both male and female, average 2 points less than those of foreign-born Jews.⁵

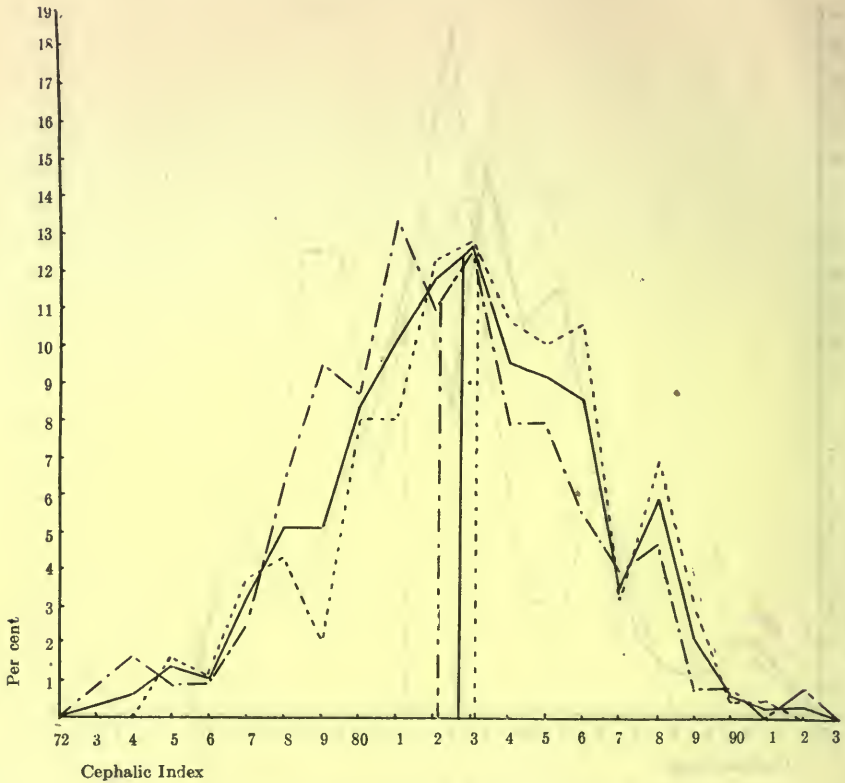


FIG. 3.

Total observations	—————
Jews born in America	- - - - -
Jews born in Russia

In conclusion, then, it may be said that, in spite of the lack of material, which makes it impossible to compare these results with many of the conclusions reached by Dr. Boas, one point can be compared,

⁵ Boas, *op. cit.*, p. 56.

TABLE 7. ARITHMETIC MEAN, STANDARD ERROR, STANDARD DEVIATION, AND STANDARD ERROR OF STANDARD DEVIATION BY GROUPS

	MEAN	ERROR	DEVIATION	ERROR
Male Russian.....	82.56	±.27	±3.16	±.19
Female Russian.....	84.77	±.46	±3.18	±.32
Russian.....	83.13	±.24	±3.31	±.20
Male American.....	81.79	±.34	±3.29	±.24
Female American.....	83.25	±.54	±3.04	±.38
American.....	82.16	±.30	±3.41	±.21
Totals.....	82.74	±.19	±3.38	±.13

TABLE 8. ARITHMETIC MEANS AND STANDARD DEVIATIONS OF GROUPS ACCORDING TO SEX AND COMBINED, WITH DIFFERENCES

	RUSSIAN	AMERICAN	DIFFERENCE
Males:			
Mean.....	82.56	81.79	.77
Deviation.....	±3.16	±3.29	.13
Females:			
Mean.....	84.77	83.25	1.52
Deviation.....	±3.18	±3.04	.14
Combined:			
Mean.....	83.13	82.16	.97
Deviation.....	±3.31	±3.41	.10

namely, the relation of the head form of the Russian-born Jews to that of the American Jews born of Russian parents. This comparison shows that the condition found by Dr. Boas to exist among the Jewish immigrants living in New York holds true also, as far as the material in hand is concerned, with those Jewish immigrants living in Boston.

As to the causes of this condition, namely, a slight decrease in the cephalic index of the American Jews as compared with the Russian Jews, it would be presumptuous to offer an opinion. It is possible only to agree with Dr. Boas' words: "I have no solution to offer. I have only stated the results of my observations and considered the plausibilities of various explanations that suggest themselves, none of which were found satisfactory."⁶

PHILLIPS ACADEMY,
ANDOVER, MASS.

⁶ Boas, *American Anthropologist*, n. s. 14, p. 562.

ANTHROPOMETRY AND METHODS

SOLID MEDIUM IN PREPARATION OF SKELETONS BY BACTERIAL DIGESTION

RALPH G. HURLIN

Biological Laboratory, Clark College, Worcester, Massachusetts

The use of solid medium in the preparation of small vertebrate and human skeletons by bacterial digestion of the attached tissues affords several advantages over the older method of immersing the roughly cleaned skeletons in a fluid culture of bacteria. The solid medium reduces the odor given off from the digestion mass and permits of convenient handling, which is of importance when the extent of the digestion process must be carefully controlled. When the process is completed the solid medium retains the disarticulated elements in their original relations, permitting their removal and mounting without danger of loss or displacement. The method is applicable to any skeleton which can be conveniently embedded, though its greatest advantage is found with small skeletons where the minor parts are easily lost or confused.

The method is as follows: Skeletons from which the skin and muscles have been somewhat carefully cut away are embedded in a plain agar solution in a suitable container. Covered glass dishes are desirable. An agar solution, 15 grams per liter of water, gives a sufficiently stiff medium. This is filtered while hot through a cotton and cheesecloth filter to give greater transparency and cooled to pouring temperature (43° to 45° C.). The skeleton is then embedded and set aside to allow bacterial growth. Inoculation of the skeletons with pure cultures of proteolytic bacteria has been tried, but this seems unnecessary, as the preparatory cleaning process affords adequate inoculation. The time required for digestion depends somewhat upon the preparatory cleaning and also upon the age of the animal. It may be greatly reduced by the use of incubator temperature. The preparation is tested from time to time to determine the extent of the digestion. For particularly delicate work the skeleton may be re-embedded in fresh medium once or

twice to prevent obscuring the parts by the abundant bacterial growth. When the attached tissues are sufficiently decomposed the solid medium is cut away and the bones are removed and washed or wiped free of the tissue remnants. If prior to embedding the blood has been carefully washed from the remaining flesh, the bones thus prepared dry out very white and bleaching with hydrogen peroxide is rarely necessary.

Good results are obtained with foetal and embryonic skeletons, but special precaution is required if cartilaginous parts are desired because of the ease with which the cartilage is destroyed by the bacterial enzymes. With pig embryos of 20 mm. two days at incubator temperature, or somewhat longer at room temperature, is sufficient to thoroughly soften the embryonic flesh and loosen the periosteal and perichondral tissues. The skeleton is then removed to 70 per cent alcohol to stop the bacterial action and is cleaned by carefully removing the loosened tissues under alcohol. While the cleaning of embryonic skeletons is not difficult without bacterial action, there is less likelihood of splitting and tearing the cartilages by this method and foramina and centers of ossification in the cartilage are beautifully exposed in this way.

The method has, perhaps, its greatest utility as a classroom method, where it reduces the objectionable features of the fluid digestion mass. It is, however, adapted to accurate anatomical and anthropological investigation, if due care in controlling the extent of the digestion is exercised.

With osseous skeletons mounting for permanent preservation presents no difficulties, but with embryonic and foetal skeletons, where the entire or a considerable part of the skeleton is cartilaginous, mounting in fluid is necessary. Flat mounts can be made with brief expenditure of time by partial embedding of the prepared elements in a layer of gelatin sufficiently thick to hold them in place. The mount is then covered with weak alcohol and sealed. In such mounts cartilage and bone may be beautifully differentiated by the familiar method of alizarin staining prior to mounting.

LITERATURE¹

I. ANTHROPOLOGY AND RESEARCH, IN GENERAL

LA BIOLOGIE HUMAINE. By Grasset (J.)—16mo, Paris, 1917, 344 pp.

This volume is a part of the series of the Bibliothèque de Philosophie scientifique. It is a serious work by an Honorary Professor of the Faculty of Medicine at Montpellier and Associate of the French Academy of Medicine, and well worth perusal. It was not inspired by the war, having been begun long before, but this renders it more opportune. Its object is "to show the right of existence of *human biology* as a separate science, distinct of general biology." It does not deal with the origin of man and his connections with the rest of animal life, but "devotes its attention solely to the *human species* as constituted since a great length of time, and to its functions, more particularly those of psychical order, which differentiate man completely from other higher animals and the rest of the living organisms;" and its object is to provide a solid foundation, the "*au nom de quoi*," to the moral and social sciences, which, especially at present, are greatly in need of such a basis. It is "in the name of human biology that moral principles are to be inculcated to individuals as well as nations, if we are to give these principles, social and international, an absolutely indisputable, and of necessity universally recognized, status and authority." This does not mean that the new science can be all-efficient in this direction; "it only means to say that natural moral principles, which are eternal and well known, but which by many are slighted, can and should be taught, at least in bold outlines, in the name of positive and experimental science, the sole authority which today is universally accepted."

The scope of this deserving work, which under another name is a highly valuable contribution to sociology and eugenics, will best be appreciated from the following abstract of the table of contents:

1. Human biology, meaning, scope and importance; 2. Life and living organisms; evolution; birth, death; 3-4. Activities of living beings; defense; survival; biological disharmonies; 5-11. Disease and intermediary conditions between health and disease; defense of system against noxious agencies; 12-13. Defense between individuals, and of species; generation; heredity; 14-16. The nervous system and mentality as factors in human biology; 17-18. Biological laws of the family and the society; protection, assistance; defense; 19. Agencies which, in present state of knowledge, remain outside of the scope of human biology.

¹ Reviews and abstracts by Associate Editors or authors will be initialed; those not initialed are by the Editor-in-Chief.

EVOLUTION; MAN'S ORIGIN; EARLY MAN

GALLIC GRAVES—SOISSONS. By Schuchhardt (C.)—Ber. Kunsts., 1915, XXXVI, cols. 260-264; 2 figs. Note in *Am. J. Archaeology*, Jan.-Mar., 1918, XXII, No. 1, 81.

Between February and April, 1915, German troops on the west front east of Soissons excavated thirty-two Gallic graves of the early La Tène period, or about 500 B.C. All of the finds were deposited in the Berlin Museum.

MAMMOTH STATION—MORCHIES. By Commont (V.) and Boule (M.)—*L'Anthropologie*, July-Oct., 1917, XXVIII, 475-477.

On June 13, some soldiers of the Engineer Corps of the British army, while making a dugout on the western front, at Morchies (Pas-de-Calais), uncovered, at a depth of 6 meters, pieces of a fossil elephant tusk. The find was reported to the French Government, which detailed Professor Boule to look into the matter, and M. Commont was sent to examine the site. The results of the examination were the discovery of a "prehistoric site with the cold fauna of the Mammoth, extending over an area more than 12 meters long, in which are buried, under 6 meters of soil, the remains of various animals perhaps cut to pieces by our ancestors." No human bones were discovered during the preliminary examination, and as it was impossible at present to continue the excavation, due to the proximity of the fighting line, the opening of the dugout has been closed and marked for future investigation. It is quite possible that skeletal remains of man, proceeding from the same period as the fauna recovered, may yet be found in this locality.

LA POSIZIONE ANTROPOLOGICA DELL'UOMO FOSSILE DI COMBE CAPELLE. By Giuffrida-Ruggeri (V.)—*Rivista di Antropologia*, 1917, XXI, 1-8.

The author contends against the association, by Zaborowski, Osborn and others, of the Combe-Capelle cranial type with that of the Cro-Magnon. The former is characterized by pronounced dolichocephaly, high vault and relatively broad nasal aperture; the Cro-Magnon skull is less dolichocephalic, has relatively much lower vault and much narrower nasal opening.

HUMAN ONTOGENY: EMBRYOLOGY; CHILDHOOD; ADOLESCENCE; DECLINE; DEATH

INFLUENCE OF THE SEX GLANDS ON DEVELOPMENT. Editorial, *J. Am. Med. Assn.*, Chicago, 1917, LXIX, 1972.

Editorial discussion of some recent studies on the influence exerted by the genital glands on the other parts of the reproductive apparatus, and on the body generally. The removal or transplantation of these glands before puberty may, as is well known, result in conspicuous

alterations in physique, as well as physiologically and mentally. It is apparent that the male and female glands produce specific active principles or hormones which favor the development of corresponding physical and functional peculiarities, by furthering or inhibiting the natural continuance of conditions in the growing organism.

THE PINEAL GLAND. By McCord (C. P.)—*Tr. Am. Gynec. Soc.*, Phila., 1917, XLII, 41-63, 3 pl.

The pineal gland's influence upon growth and differentiation, with particular reference to its influence upon prenatal development. A valuable communication, with extensive bibliography. Author's summary:

"From the lack of unanimity in the literature any conclusions as to the details of pineal gland function must be made flexible rather than dogmatic. A survey of available data leads to the following summary as representing the present status of the pineal as an organ of internal secretion:

"1. A clinical syndrome is to be associated with disturbances of the functions of the pineal gland. Because of the involution of the pineal at puberty, the constitutional manifestations of pineal pathology appear to be confined to prepuberal years. The essential characteristics (apart from pressure and neighborhood manifestations) are (a) early sexual development evidenced in the enlarged genitalia, pubic hair, general body hair, early change in voice; (b) precocious mental development, manifested in maturity of thought and speech; (c) general overgrowth of body to the extent that a child of 6 or 7 years may have the appearance of a child near puberty.

"2. The experimental extirpation of the pineal gland is surgically possible. The gland is not essential for the maintenance of life. The early symptoms following pinealectomy are attributable to the severe brain injury. No changes attend the removal of the gland in adult animals. As to the effects of pinealectomy in young animals, Sarteschi, Foa, and Horrax respectively state that the removal of the gland leads to precocity of development. Exner and Boese, and Dandy report no changes after pinealectomy.

"3. The administration of pineal substance to young mammals is reported to hasten growth and sexual maturity. In unicellular organisms (paramoecia) pineal extracts increase the rate of reproduction to more than double that of controls. In larval forms (ranidae) both growth and differentiation are hastened as a result of pineal feeding.

"4. The inference is allowable that the pineal gland is an organ of internal secretion, whose functions, however, are of minor significance in the general activities of the endocrinous system."

THE GROWTH OF BOYS: DENTITION AND STATURE. By Spier (Leslie). *Am. Anthropol.*, 1918, XX, No. 1, 37-48.

"Studies of growth usually give measurements of individuals based on their actual or 'chronological' ages and not on their physiological

status." The paper under consideration is an attempt at a study of the physiological relations of stature and the state of dentition, and is based on plaster casts of the dental arches and measurements of stature of "some 350 school-boys of Utuado, Porto Rico, collected by Professor Franz Boas in 1915." The results show, in brief, that there is "a marked functional relation between stature and stage of dental development;" but this does not settle the problem as to whether or how far this is simply a parallelism or true correlation.

THE DURATION OF LIFE AND CONDITIONS ASSOCIATED WITH LONGEVITY. By Bell (Alexander Graham)—Small 4°, Wash., 1918, 57 pp.

As a foundation of his study the author has taken the Genealogy of the Hyde Family; but the thousands of descendants noted in this genealogy extending over many generations constitute a sample of the general population of the country rather than one of a particular family. The subject is considered from the following points of view:

- (1) Period of birth;
- (2) Duration of life of persons;
- (3) Duration of life of males and females;
- (4) Duration of life of fathers and mothers;
- (5) Duration of life of persons compared with the duration of life of their parents;
- (6) Duration of life of fathers and mothers compared with the number of children born to them;
- (7) Duration of life of persons compared with the ages of the parents at marriage;
- (8) Duration of life of persons compared with the ages of the parents when the persons were born;
- (9) Duration of life of persons compared with the number of years after the marriage of the parents the persons were born; and
- (10) Duration of life of persons compared with number in family (Siblings).

The results of the study are of such interest that they deserve to be quoted almost in full, especially as the publication in which the report appears may not be readily accessible. Of the 8,797 persons embraced in the Hyde statistics there were 2,965 whose ages at death were known; the average duration of life of these persons was 34.6 years, 35.2 per cent dying before 20 and 7.3 per cent living to be 80 or older.

"There were critical periods in the lives of these persons when the danger of death was greater than at other times. The danger was greatest in infancy, especially during the first year of life; and a second danger period appeared during adolescence, reaching its maximum at or about the age of 23 years.

"Both the males and females show an increase in the number and proportion of deaths occurring during adolescence, and in both cases the maximum appears at the age-period 20-25 years. But the death curve for males exhibits quite a sharp peak at this point which is absent from the female curve, suggesting some cause of death at this period of life

affecting males more powerfully than females. Unfortunately the statistics do not give us any information concerning causes of death.

"The males upon the average lived longer than the females, and yet more females than males lived to extreme old age.

"A larger proportion of females than of males died in childhood before reaching the age of 20 years, in spite of an excessive mortality of males during the period of infancy. Thus a larger proportion of males than of females lived to adult life.

"A larger proportion of females than of males died between the ages of 20 and 40. Females, of course, were exempt from military service; but they were exposed, during the child-bearing period, to dangers which did not affect the male population at all.

"A larger proportion of females than of males lived to be 95 years of age or older. The few winners in life's race were largely females.

"The fathers, on the average, lived longer than the mothers; and yet more mothers than fathers lived to extreme old age.

"Hereditv was deeply involved in the production of longevity.

"The influence of the father seemed to be somewhat greater than that of the mother.

"The average duration of life of offspring was greatest where the parents were long lived, least where the parents were short lived, and intermediate where the parents died at intermediate age-periods.

"There was thus a direct correlation between the duration of life of parents and the duration of life of their offspring.

"Thus virility on the part of the parents had something to do with the duration of life of the offspring.

"Children born between four and eight years after the marriage of their parents were, upon the average, longer lived than those born earlier or later in married life.

"First-born children were fully up to the average of the whole in vitality and lived as long.

"The majority of the persons who were the only children of their parents died young; but there were only 41 cases.

"Both in very small families (containing only one or two children) and in very large families (containing thirteen or more children) the proportion who died young was very large and the proportion who lived to be old small.

"The proportion who lived to be old increased with the size of the family up to families containing nine and ten children, and fell again in the case of larger families.

"Parents who died early in life had comparatively small families, because on the average they did not live long enough to develop their full reproductive powers.

"The average number of children produced increased with the duration of life of the parents, even in cases where the parents had passed the reproductive period of life.

"There was thus a direct correlation between the duration of life of the parents and the number of offspring born to them. The longer-lived parents were the most fertile.

"Only a small proportion of the population born lived to be old; but a large proportion came from long-lived parents.

"The males of one generation became, of course, the fathers of the next generation. At least some of them did; but some did not marry and others had no offspring.

"If, then, the above percentages should hold good for two successive generations, it is obvious that less than 7.8 per cent of the males of one generation would become the fathers of 24.9 per cent of the whole population born in the next generation, and that less than 6.8 per cent of the females would become the mothers of 23.0 per cent of all the children born in the next generation.

"If these proportions should hold true for two successive generations then less than 8.7 per cent of the people of one generation would become the fathers or mothers of nearly half of the population born in the next generation (48.1 per cent).

"The above illustrations indicate that long-lived people, though few in number, may profoundly affect the composition of the whole population born in the next generation.

"The statistics indicate that a tendency to longevity is an inheritable characteristic, capable of being handed down from parents to children.

"What is really inherited is probably a tough, wiry constitution that enables the fortunate possessor to survive the multitudinous ills that flesh is heir to and live on to the extreme limit of human life. From this point of view the attainment of old age is extremely significant. The last survivors of a whole generation are people who have by the very fact of their surviving to old age proved themselves to be resistant to disease. They have been exposed to the diseases and accidents that have cut off the vast majority of their fellows before their prime, but have not succumbed.

"The statistics indicate that this disease-resistant quality is inherited by offspring; and, through the superior fecundity of the long lived, distributed very generally throughout the population.

"Here we have evidence of the existence of a natural process at work among human beings tending to improve the vigor and vitality of succeeding generations."

HEREDITY; EUGENICS

HEREDITY AND ENVIRONMENT, in the development of men. By Conklin (Edwin Grant)—Rev. 2d ed., 12mo, 1918, Princeton Univ. Press, 550 pp.

This can best be described as an excellent textbook on the whole rich field which it covers. It is a clear, high-class, wholesome production of a past master of the subject, and it is no platitude in this case to say that the book should be read and reread by every anthropologist. In fact it is written for and should be read by every well-educated American man and woman. There is nothing of equal value in this line in the English or any other language.

Professor Conklin is one of the few modern biologists to whom, like to Linnaeus or Buffon of old, biology of lower forms is not the end in itself, but a means by which to approach the understanding of the most complex and important product of nature, the human being; and that not only the anatomical man, but mankind in all its attributes. In consequence his work deals not merely with human (and other animal) genesis, development, heredity and environment, but also with the control of these processes, and with the functions of the human mind, of the human individual, and of human society.

The work is divided into six chapters: I. The facts and factors of development; II. Cellular basis of heredity and development; III. Phenomena of inheritance; IV. Influence of environment; V. Control of heredity: eugenics; and VI. Genetics and ethics. To which are added references, index and a very useful glossary.

The book begins with the sound facts of organic principles and ends with sound philosophy about the powers and duties of human society. It is impossible, in the scope of a review, to point out all the important deductions of the author. A few relating directly to man will, however, illustrate his views.

Speaking of heredity and environment, Professor Conklin concludes that—"All hereditary variations, whether due to new combinations of old characters or to the appearance of actually new characters, whether small and continuous or large and discontinuous, have their causes in the organization of the germ cells, just as do inherited resemblances. Heredity is not to be contrasted with variation, nor are hereditary likeness and unlikeness due to conflicting principles; both are the results of germinal organization and both are phenomena of heredity." As a result of the permutations of ancestral characters, the appearance of mutations, and the fluctuations of organisms due to environmental changes, it happens that in all cases the offspring differ more or less from their parents and from one another. Every living being, in fact, appears on careful examination to be the first and last of its identical kind.

"Developed characters, whether 'acquired' or not, are never transmitted by heredity, and the hereditary constitution of the germ is not changed by changes in such characters. Probably environmental stimuli acting upon germ cells at an early stage in their development may rarely cause changes in their hereditary constitution, but changes produced in somatic cells do not cause corresponding changes in the hereditary constitution of the germ cells" (p. 359-60). Man's environment is more extensive than that of any other animal, and its influence on his development is correspondingly greater. Moreover, the period of immaturity in man is longer than in any other vertebrate, and it is during this formative period that environment and education have their greatest influence.

(P. 210) "Psychological characters appear to be inherited in the same way that anatomical and physiological traits are; indeed all that has been said regarding the correlation of morphological and physiological

characters applies also to psychological ones. No one doubts that particular instincts, aptitudes and capacities are inherited among both animals and men, nor that different races and species differ hereditarily in psychological characteristics."

(P. 213) "The entire organism, consisting of structures and functions, body and mind, develops out of the germ, and the organization of the germ determines all the possibilities of development of the mind no less than of the body, though the actual realization of any possibility is dependent also upon environmental stimuli."

The environmental influences on man at present are growing in intensity. "Our psychical, social and moral environment has come to us from the past with ever-increasing increments, every age standing on the shoulders of the preceding one. The aspirations, impulses, responsibilities of modern life have become enormous and our inherited natures and abilities have not essentially improved. Social heredity has outrun germinal heredity and the intellectual, social and moral responsibilities of our times are too great for many men. Civilization is a strenuous affair, with impulses and compulsions which are difficult for the primitive man to fulfill, and many of us are hereditarily primitive men. The frequent result is disharmony, poor adjustment, a struggle between primitive instincts and high ideals, with a resulting sense of discouragement and defeat which often ends in abnormal states of mind. The prevalence of crime, alcoholism, depravity and insanity is an ever-increasing protest and menace of weak men against high civilization. We are approaching the time when one or the other must give way, either the responsibilities of life must be reduced and the march of civilization stayed, or a better race of men, with greater hereditary abilities, must be bred" (p. 371-2).

All that man now is he has come to be without conscious human guidance, and in recent times he has done much to retard his evolution. No improvement in human heredity is observable within historic times. Some of the causes of this have been the perpetuation of the worst lines through sentimental regard for personal rights, even when opposed to the welfare of society; the extinction of some of the world's most gifted lines by enforced celibacy; the continuous wars which have taken off the best blood left outside of the monastic orders; the luxury and voluntary sterility; besides vice, disease and consequent infertility. The only method by which the race can be improved is that of selective breeding. "If a superior power should deal with man as man deals with domestic animals no doubt great improvement could be effected in the human breed" (p. 423). Fortunately, or unfortunately, however, the method which breeders use cannot be rigidly applied in the case of man. Yet some improvement is possible by eliminating the worst human kind from the possibility of reproduction.

"What the future evolution of the human race may lead to is an interesting speculation, but it is and can be only a speculation. There is no present evidence that there will ever be a higher animal than man on the earth, and the only evidence that there may be a higher species

than *Homo sapiens* is to be found in the fact that there have been lower species of men in the past and that evolution has been on the whole progressive. The idea that by the aid of that infant industry eugenics a new race of supermen is shortly to be produced is an iridescent dream" (p. 428).

The hybridity of the human race is going on and will increase, whether wanted or not. Fortunately the belief that hybrid races are always inferior to pure-bred ones is by no means a fact.

War under modern conditions is dysgenic. There is no doubt that it takes the best blood of the nation.

The decreasing birth rate among the best classes of people is a growing menace to the race. "We need not 'fewer and better children' but more children of the better sort and fewer of the worse variety." The means of artificially limiting the size of families may prove to be the greatest menace to the human race (p. 453-4).

The optimism of those who believe that supermen may be produced by artificially limiting the number of children is a foolish and fatal optimism.

In the final two chapters Professor Conklin expresses his firm belief in the possibilities of modifying human heredity in the right way. We must bear in mind the possibilities of development as well as the limitations of heredity. Chance, heredity, environment have settled many things for us; we are hedged about by bounds which we cannot pass, but those bounds are not so narrow as we are sometimes taught and within them we have a considerable degree of freedom and responsibility.

"It is possible greatly to improve heredity: (a) By weeding out from the possibility of reproduction human stocks bearing serious defects. (b) By cultivating pride in good heredity and discouraging voluntary infertility on the part of those who have a goodly heritage. (c) By increasing opportunities for early and favorable marriages. (d) By carefully conserving the best human mutations or inherited variations. In this way if in any way the better race will be produced. The possible improvements of heredity are great, the possible improvements of environment and training are great, but whether men of the future will be better than those of the past or present is a question not only of genetics but also of ethics."

THE THIRD AND FOURTH GENERATION: an introduction to heredity. By Downing (Elliot R.).—Univ. Chic. Press, 12mo, 1918, XII + 164 pp.

In all lines of animal and plant production the importance of heredity is recognized. This volume presents some of the evidence that ability and disability in human families are similarly heritable. It discusses some of the laws of heredity that are now fairly established in so far as animals and plants are concerned, and points out their probable human application. The book deals with familiar things and attempts to discuss the subject in simple language intelligible to those of high-school age. It is provided with a selected bibliography.

NUCLEUS AND CYTOPLASM AS VEHICLES OF HEREDITY. By Dunn (L. C.)—*Am. Naturalist*, Lancaster, 1917, LI, 286-300.

The paper is biological, but of general interest to anthropology.

INHERITANCE OF WHITE FORELOCK. By Holmes (S. J.) and Schofield (Richard O.)—*J. Hered.*, Wash., Aug. 1917, 359-360.

Pedigree of a family in which the occurrence of a lock of white hair has been traced through several generations. The lock was not evident in children but appeared about the period of puberty; and it occurred only in the males. The character behaved apparently as a dominant in the males and as a recessive in the females.

COLOR INHERITANCE IN MAMMALS. By Wright (Sewall)—*J. Hered.* Wash., May, 1917, VIII, 224-235.

Results of experimental breeding can be linked up with chemical researches on pigments—coat colors of all mammals classified as due to variations in action of two enzymes.

The article is of general biological nature but would be of interest and value to the student of human pigmentation. The author attempts "to relate the findings of the biochemist in regard to melanin pigment with the great mass of curious relations between colors which have come to light in genetic work. A scheme is given which is designed to show the interrelations of the different mammalian coat colors and a classification of color factors is suggested. It is hoped that these will be of use in organizing the present very extensive knowledge of color inheritance and in aiding in the discovery of new facts, or at least in leading to a better scheme and classification." . . . "A more thorough comparison than has yet been made of the effects of factors in all combinations should yield much data bearing on the process of pigmentation and give a very much more complete understanding of the heredity of color than we have at present."

NOTES EUGÉNIQUES. By Landau (E.)—*Rev. Anthropol.*, Janv., 1918, 26-30.

In a former communication on the subject (*ibid.*, July-Aug., 1916), the author showed that from the biological point of view, love of and desire to have children are the natural feelings for normal man and woman; while in the present paper he endeavors to show the necessary biologic conditions for the production of a normal and healthy family. In arranging marriage, it is requisite to pay serious attention not only to the individual health of the prospective parents, but also to their hereditary endowment. In view of this he insists on the need of a law obliging the man to be married, to provide a medical certificate giving the results of the Wassermann and Gramms tests, and the woman a similar certificate relating to her child-bearing capacity. Marriage should be based on eugenic guaranty. In addition, there is a need of broadening female education in biological lines on matters relating to the family. It is also important that the married woman of the poorer classes shall not be obliged to seek

outdoor occupation; that civic and particularly medical aid be extended to such women; and that the housing and hygienic conditions of the poor families be as far as possible improved. The causes of "race suicide" are deep rooted, but intelligent efforts against the tendency are not hopeless; the best means will be a wholesome and broader education, proper social hygiene, diminution of alcoholism, the right kind of aid to large families, and the general elevation of moral standards.

CAN THE HUMAN SPECIES BE IMPROVED? By Morgan (S.)—*Chem News*, Lond., 1917, CXVI, 178-180.

The author accentuates the importance of scientifically proper diet. "Imperfect food produces imperfect natures, imperfect natures produce imperfect brains, imperfect brains produce imperfect thoughts, and imperfect thoughts produce imperfect actions."

THE SUPER- AND THE SUB-NORMAL PARENT. By Redfield (Casper L.) *North Amer. J. Homoeopathy*, Feb., 1918, repr. 4 pp.

This is the forty-third short, pithy paper by the author on the subject of inheritance of mental characters, proportionate to their development in the parents, and on the consequent advantage of children born of older parents, in whom mental qualities had been progressively exercised. In this communication he adduces the example of Lincoln.

EVOLUTION OF INTELLIGENCE AND LONGEVITY. By Redfield (Casper L.)—*The Southern Practitioner*, March, 1918, repr. 5 pp.

The communication, written in the usual good form of the author, strikes a new note. Besides reiterating his old conviction that, in the main, everything else being equal, superior children come from older parents, and especially when we have older normal parents for two or three generations in succession, Mr. Redfield also claims, basing his claim on studies of family and individual conditions of 1,105 persons, that, "as long as parents retain their health and strength, the older they are when their children are born, the greater will be the natural longevity of those children."

MAN'S VARIATION: OSTEOLOGY

THE FONTANELLA METOPICA AND ITS REMNANTS IN AN ADULT SKULL. By Schultz (A. H.)—*Am. J. Anat.*, 1918, XXIII, No. 2, 259-271.

The fontanella metopica s. medio-frontalis, is a small unossified area found not uncommonly in the skull of the newborn. Occasionally it leaves traces, in the form of short suture, fissure or scar, recognizable in the skulls of children and even adults. The author "has found in the skull of an adult an abnormal suture, which is comparable to those above mentioned, but which is more extensive than in any of the cases previously described." The skull in question is that of an American negro, and it presents a transverse, irregular, somewhat W-shaped suture, situated 2.5 cm. above nasion and 1.5 cm. beneath a line connecting the two frontal eminences. On the inner surface of the skull the suture is likewise exten-

sive, though of different shape. The causation of these anomalies is discussed, and there is a bibliography.

VARIATIONS IN THE GLENOID FOSSAE. By Sullivan (Louis R.)—*Am. Anthropol.*, 1917, n.s., XIX, No. 1, 19-23.

Stimulated by F. H. S. Knowles's paper on the "Glenoid Fossa in the Skull of the Eskimo" (*Anthrop. Ser. 4, Mus. Bull. 9, Canad. Geol. Surv.*), in which the Eskimo are spoken of as the "champions of the shallow glenoid fossae," the author undertook investigation of the glenoid fossa on skulls in the American Museum of Natural History. In a preliminary report Dr. Knowles's conclusions were corroborated, but it was also pointed out that the shallow glenoid fossa occurred with similar frequency in the skulls of other American aborigines. Reference to early literature shows that it is also not an uncommon characteristic in skulls from other parts of the world. Tough food and a consequent side-to-side and rotary movement of the mandible were assigned as the causes. More extended study would indicate that no one causal factor can be singled out as accounting for its occurrence. In some instances it is undoubtedly the retention of an embryonic character, in others it may be due to a lateral grinding movement of the mandible in mastication, but more often (and especially among the Eskimo) it is apparently conditioned by the cutting and tearing action of the incisor teeth which necessitates bringing the condyles of the mandible forward on the articular eminences.—L. R. S.

GROWTH OF THE NASAL BRIDGE IN CHILDREN. By Sullivan (Louis R.)—*Am. Anthropol.*, 1917, n. s., XIX, No. 3, 406-409.

A study on a series of outlines of the nasal bridge of school children of Worcester, Mass., collected by Boas, showed that the nasal bridge is one of those characters which does not reach full development and final form until late in life. Growth in antero-posterior direction continues until about the age of 14 in girls, and until about the age of 17 or later in boys. The yearly increment and rate of growth are also interesting, showing similar sexual differences, as stature, weight, and many other characters.—L. R. S.

JAWS AND TEETH

COMPLETE BONY ANKYLOSIS OF THE JAW. By Carr (W. P.)—*Surg., Gynecol. and Obs.*, Oct., 1917, 367-371; repr. 1-5.

The author mentions having seen "in consultation a child with congenital fusion of the alveolar processes of the upper and lower jaws. There was a history of two previous children of the same parents, who died of starvation from the same cause." Besides this, he operated successfully within the last few years on three cases of adults with unilateral (1) or bilateral (2) bony ankylosis of the jaw, of from 18 to 25 years duration, due to traumatism.

OBSERVATIONS ON THE FORM OF THE DENTAL ARCH OF THE ORANG. By Hellman (Milo)—*Internat. J. Orthodont.*, Feb., 1918, IV; repr. 15 pp., 19 figs.

The study is based on the extensive collection of orang skeletal material (83 skulls) in the U. S. National Museum; and the author aimed mainly to find an answer to the following questions: (1) Does the dental arch of the orang conform to the outline as described by various authorities? (2) Is the "diastema" in the orang dentition a phenomenon similar to that appearing in some lower forms? (3) Is the labidonty or edge-to-edge bite an exclusively pithecoïd characteristic?

The conclusions are that there are five types of orang arch, namely the pyriform, the U-shaped, the diverging, the oval, and the saddle-shaped arch. (Compare Hrdlička, A.—The Normal Dental Arch, *Dental Cosmos*, Sept., 1916, p. 1029, et seq.; also Anatomical Observations on a Collection of Orang Skulls from Western Borneo. *Proc. U. S. Nat. Mus.*, XXXI, 1906, 539–568.) The frequency of these shapes, so far as the upper arch is concerned, corresponds to the order in which they are named.

The diastemae in orang are "a manifestation of mechanical conditions brought about by the canines during their development and functional activity, and must be regarded in a sense different than the diastemae of other forms, as those, for instance, of the ungulates."

The edge-to-edge bite of the incisors is prevalent in the orang, but "it is not an exclusive characteristic, and may be found to exist in the Indian dentition to an equally high degree, while the overbite relationship is also of frequent occurrence in the ape."

The paper, it is hoped, is only preliminary to a more detailed study of the highly interesting subject of the dental arches and palate in the orang and other anthropoid apes.

NOTE SUR L'EXISTENCE DE TUBERCULE DE CARABELLI (Cuspide supplémentaire des molaires supérieures) AUX TEMPS PRÉHISTORIQUES, DANS L'ANTIQUITÉ ET AU MOYEN ÂGE. By Jeanselme (E.)—*Bull. Acad. de méd.*, Paris, 1918, 3 s., LXXIX, 55–59.

On the buccal surface of the first and occasionally also the second molars there occurs a small elevation or tubercle, the frequency of which is such that the author observed it in from 40 to 45 per cent of the subjects examined. In 15–20 per cent of these subjects the tubercle showed more or less marked trace of separation. This supernumerary cusp is known as the tubercle of Carabelli. The author's records show it to be quite as frequent on the second temporary as on the first permanent molar. In its pronounced form the tubercle may be regarded as simply an exaggeration of an anatomical tendency which is so frequent that it can be regarded as normal. It appears to exist in all living races, was present in the paleolithic period (Krapina, a specimen of *H. mouster.*), and was not rare in the neolithic or early historic times.

The significance of the feature has been variously interpreted; but recently a prominent clinician thought he saw in it a sign of hereditary syphilis. This opinion is wholly untenable and dangerous. The origin

of the tubercle is to be found in normal conditions occurring in lower forms; it is a more or less marked vestige of the "denticules adventices" which exist in the lemurs, monkeys and the anthropoid apes, and proceed from the cingulum. In some of the anthropoid apes, particularly the gibbon, one finds occasionally, developed from the cingulum, a cusp resembling in every way the Carabelli tubercle in man.

ANOMALIES DES INCISIVES OBSERVÉES SUR UN GORILLE. By Neuville (H.)—*L'Anthropologie*, Paris, 1917, XXVIII, 257-262.

Extra dental elements appearing in the jaws are divisible into two categories, the *supplementary*, which occurs in the rear of the last molars, and the *supernumerary*, intercalated between or in juxtaposition to the teeth of the normal series. It is held that anomalies of these classes are much more common in the superior than in the inferior jaws; that they are much more frequent in the permanent than in the temporary dentition; and that while very common in man as well as in the domestic mammals, and still frequent so far as the molar region is concerned in the apes, they become very rare in the latter in the region of the incisors. The abnormal teeth may be more or less like the normal teeth in the series in or near which they occur, or present the simple, conical, archaic form of vertebrate teeth.

The anomalies described by the author are present in the incisor region of both jaws of a young adult gorilla (sex?), recently received from Fernan-Vaz by l'Institut de Paléontologie humaine of Paris. The lower jaw shows only two incisors, while the upper presents six, of which four located as usual and two situated back of the medians. Judging from their form, the inferior teeth appear to be that on the left the median and that on the right the lateral incisor. The anomaly in this case can be explained either as a primary trouble connected with the formation of two of the four dental follicles, or as a very early traumatism which left no traces on the bone.

In the upper jaw the four regular incisors occupy their normal positions in the dental arch and present the ordinary type of median and lateral incisors of the gorilla. As to the supernumerary teeth, they plainly are not teeth of the temporary dentition. They resemble on the whole the median incisors, though their cutting edge is slightly narrower. All six teeth are well formed and implanted. As to the explanation of the anomalies, the author is averse to accept the theory of reversion to lower forms.

The final two paragraphs of the paper are devoted to the consideration of the order of eruption of the permanent teeth in gorilla, and to the cuspids of its third molars. The conclusion as to the former is that the canines erupt in this ape well before the second and third molars. As to cuspids, the third upper molars of the specimen each has four, but with a considerable reduction of the P. I., showing clearly a tendency toward the tricuspide type, searched for in vain by some earlier authors.

ESQUEMA GEOMETRICO DEL CRÁNEO EN FUNCION DEL MOLAR QUE BROTA Á LOS SEIS AÑOS. By Valderrama (J.)—*Odontologia*, Madrid, 1917, XXVI, 65-73.

The author, auxiliary professor at the School of Odontology, Madrid, discusses the application, in connection with orthodontia, of certain new and interesting anthropometric procedures, which are expected to show the connection between certain conditions of the teeth and modifications in the form of the cranial vault. Regrettably the paper is not as thorough and as documented as might be desirable.

The method given may find application in anthropology as well as in dentistry.

VARIATION: LIMBS; SOFT PARTS

NEUF CAS DE POLYDACTYLIE HÉRÉDITAIRE AU COURS DE CINQ GÉNÉRATIONS. La polydactylie dans ses rapports avec les lois de Mendel. By Benard (René)—*N. iconog. de la Salpêtrière*, Par., 1916-17, 147-161.

Anomalies of this nature are known of since remote antiquity, and it is equally well known that they are hereditary. The subject of the report is a six-fingered and six-toed (left foot) man in whose family the author found not less than eight other persons with this variety of anomalies. By means of radiograph it is seen that the bones of the supernumerary digits are more or less defective. The father of the subject presented similar anomalies externally, but the bony constituents of the abnormal digits are much more complete, and the radiogram of the right foot, which externally has but five toes, showed a perfectly developed bony system of six toes. The various special characteristics of the bony parts of these hands and feet are like those reported in former cases.

The study of these individuals and the family as a whole permits the following tentative conclusions:

Polydactyly, when appearing as a family character, obeys apparently the Mendelian laws of heredity and seems to possess the character of a dominant affection.

The malformations which are hereditarily transmitted do not necessarily present, in the course of generations, either increasing or decreasing tendency, but often follow an irregular course as to their intensity.

When a malformation is hereditary in a high degree, it almost invariably involves the first-born of each generation

ACCESSORY LUNGS. By Gladstone (R.)—*Proc. Anat. Soc. Gr. Brit. and Ire.*, June, 1916, 8-9. In *J. Anat.*, Lond., 1917, LI.

A short report on two accessory lungs in a human subject, situated between the base of the left lung and the stomach, and in no way connected with the rest of the pulmonary system. No discussion as to significance.

THE PECTORALIS MINOR: a morphological study. By Lander (Miss M. K.)—*Proc. Anat. Soc. Gr. Brit. and Ire.*, Dec., 1916, 13-14. In *J. Anat.*, Lond., 1917, LI

Brief but interesting report on phylogenetic and ontogenetic variations in the distal attachment of the muscles, with remarks on the variation of the coracoid.

NOTE ON LENGTH OF VERMIFORM PROCESS in 200 consecutive postmortem examinations. By Macphail (S. Rutherford)—*J. Anat.*, Lond., 1917, LI, 308.

The subjects comprised 115 males with 105 females, ranging from 20 to 92 years of age. The average length of the appendix in the males was found to be 10.2 cm. (4.09 in.); in the females 9.6 cm. (3.85 in.). The shortest was 2.5 cm. (1 in.); longest 18.75 cm. (7½ in.). There was no definite difference in cases over 50 and those under that age.

A SUBJECT WITH COMPLETE TRANSPOSITION OF VISCERA. By Rahman (Amin Abdel)—*J. Anat.*, Lond., 1917, LI, 304-307.

The body of an old Egyptian male, very good general development. On autopsy all thoracic as well as abdominal viscera were found in more or less perfect transposition.

The author gives detailed description of the parts, but no discussion or bibliography.

SOME CONCLUSIONS BASED ON STUDIES IN CEREBRAL ANTHROPOLOGY. By Poynter (C. W. M.)—*Amer. Anthropol.*, 1917, n. s., XIX, 495-502.

After pointing out the difficulties of cerebral study, and calling attention to what up to now has been done in experimental work on the cortex, the author proceeds to a brief discussion of the results obtained by him on a brain of a Mexican and on those of a series of American negroes. The negro brain, "while it does not necessarily suggest a closer relation to the apes, is not as highly developed as that of other races observed and is consequently inferior to them." On the other hand, in the case of the Mexican and Indian brains, although we have as yet insufficient data to formulate any conclusions on racial characteristics, yet "from the material at hand it seems that they possess all of the elements necessary for higher individual development." Collection of further Indian brains is urged; and the author also points out that much can be expected from embryological research on the brain.

As to methods of study, "it would seem that cerebral anthropology is dependent for its ultimate development on functional localization in the cerebral cortex. Such localization involves so many different factors that we can not hope for a solution of the problem by any one method of research or by any one department, but only by a thorough weighing and assorting of all the evidence contributed by the investigators in all departments. Since anthropology will benefit so largely by the answer to this question her workers should contribute their share toward its solution."

AN ESTIMATION OF THE PROPORTIONS OF GRAY AND WHITE MATTER IN THE HUMAN BRAIN, made through the plane of the optic chiasm by means of the planimeter. By Taft (A. E.)—*J. of Nervous and Mental Diseases*, March, 1918, XLVII, no. 3, 161-175.

"The variation in the proportion of gray and white matter in the human brain is apparent, without definite measurement, if a large number of frontal sections through the same plane are examined; a degree of variation is seen also in the depth of the sulci.

"If the ontogeny of the cerebral hemispheres is considered, it becomes evident that there is opportunity for a disparity in the development of the cellular gray and white nerve-fiberelements."

The studies reported by the author extend to 157 specimens, including brains of persons without any mental diseases, of infants, of the criminal, and of various classes of the mentally abnormal. Planimetric measurements were made on a single frontal section through the plane of the optic chiasm, to determine the proportions of white and cortical gray. The results are somewhat peculiar and call for much further observations, particularly on normal persons:

"The average of the proportions found in non-mental, feeble-minded, maniac-depressive, and unclassified, indicates only a small margin of difference between these groups. Epileptic and criminal are very closely allied, as are the dementia praecox and senile dementia groups. The averages in these eight series indicate that the white substance is present, in the plane measured, in greater proportion than the cortical gray. Opposed to this finding is the proportion in the infants and microcephalics, including the 'Mongolian' group, in which the average proportion of cortical gray exceeds that of the white substance.

"Sex, age and brain weight do not appear to have any constant relation to the proportions existing between white substance and cortical gray, although in some cases the proportion of white varies directly with the brain weight.

"Brains of Mongolian idiots manifest the infant-microcephalic relation between gray and white substance."

PIGMENTATION IN GUINEA PIG HAIR. By Hunt (Harrison R.) and Wright (Sewall)—*J. Hered.*, April, 1918, XIX, 178-181.

Red hair in the human subject is one of the highly interesting phenomena which have thus far failed to be properly explained and any light on which is welcome, even though it may be indirect.

The authors compare pigmentation in black and red hair of guinea pigs. The black hair of these animals "contains only granules and these are dark in color. Red hair contains both granules and diffuse pigment, and these are light in color. There is a difference in distribution; in black hair, granules are abundant in both cortex and medulla, while in red hair they are found almost exclusively in the medulla." They refer also to the fact that Miss Durham found dilute alkali dissolves red pigment easily and black hardly at all, and that Görtner found that black pigment from several sources contained considerable iron while red pigment contained virtually none—C. B. D.

VARIATION: RACIAL

THE "HALF-BREED" ASCENDANT. By Jenks (Albert Ernest)—*Public. Am. Sociol. Soc.*, 1917, VII, 101-107.

Neither anthropological nor sociological literature says much of the so-called "half-breed," the man of mixed ethnic ancestry; yet the field

student of primitive peoples knows him well. Among primitive peoples cultural assimilation and ethnic amalgamation go hand in hand. The "half-breed" is generally sired by a man of a cultural group superior to that of the mother, among whose group he is usually trained. Members of the mother's group say of him, "He 'nother kind man," or "He does not belong," or "He born in the woods." He probably possesses a psychic heritage different from that of the average member of both his mother's and father's group, and is usually in possession of an inherited intellectual capacity greater than that of his mother's group. Such a "half-breed" is usually less responsive to the pressure of social customs than are the other members of his group, so he is frequently spoken of as: "He no good," or "He bad man." So, whether respected or not, he is more likely to be a non-conformist than are pure-bred members of his group. In consequence, the "half-breed" among primitive peoples is better fitted by his inherited intellectual superiority and his social non-conformity to become a leader of his mother's less advanced people; not that such a group looks with favor on the "half-breed," but that, even against the will of the group the "half-breed" is a powerful factor in fixing strange beliefs, social practices, and material devices into the customs of his mother's more backward group. This fact is abundantly attested by the field students' observation among primitive peoples everywhere—including the more advanced Filipinos, American Indians and Negroes.—A. E. J.

AFRICAN TRIBES, ANGOLA. By Corrêa (A. A. Mendes)—*Antropologia Angolense. Arch. de Anat. and Anthropol.*, Lisboa, 1916, II, No. 4, 323-356, map, 19 pls.

Report of observations and measurements made by Fonseca Cardoso on the negro tribes of Quiocos, Luimbres, Luenas, and Lutchazes, of Angola, Portuguese West Africa. Includes geographical location, observation on principal habits, descriptive somatological notes, and anthropometry. While showing certain differences in stature, etc., the four tribes belong plainly to the common type of the African negro.

ASIA: ANTHROPOLOGY: A proposito di alcuni risultati antropologici della spedizione De Filippi al Caracoram. By Giuffrida-Ruggeri (V.)—*Rend. R. Accad. Sci. Fis. and Mat.*, Napoli, 1918, ser. 3, XXIV, repr. 5 pp.

A relatively brief and of necessity inconclusive discussion of the principal contributions to the anthropology of *H. asiaticus*.

OBSERVATIONS ON THE SWEAT GLANDS OF TROPICAL AND NORTHERN RACES. By Clark (Elbert) and Lhamon (Rushkin H.)—*Anat. Rec.*, Feb., 1917, XII, 139-149.

A preliminary report on the study of sweat glands of the various races, undertaken "in a coöperative way by chemists and physicists of the Bureau of Science, the departments of Anatomy, Pharmacology, Physiology and Physics of the University of the Philippines and the United States Army Medical Board for the Study of Tropical Diseases."

The present observations "scarcely extend beyond a comparison of the number of sweat glands in certain definite skin areas of various races;" some attention, however, was also paid to the size of the glands. Main attention was devoted to the glands of the plantar surfaces of the foot and the palmar surfaces of the hand, and the countings were carried out on carefully made finger, etc., prints, which were found very suitable for this purpose. The races compared were the white American, the American Negro, the ordinary Filipino, the Moro, the Hindu, and the Negrito. The results showed "a greater number of sweat glands in all the tropical than in the northern races." The differences were marked and general, with but little individual variation. A former observation that the tropical aborigines secrete only small beads of sweat over the entire body was not confirmed. As to the size of the glands, a few maceration preparations did not show any difference in the size of the sweat glands between the American and the Filipino.

VARIATION: PHYSIOLOGICAL; MENTAL

PSYCHOLOGIE DU TIRAILLEUR SÉNÉGALAIS. By Courbon (P.)—*N. iconog. de la Salpêtrière*, Par., 1916-17, 167-183.

These "tirailleurs" (riflemen) are recruited not only from Senegal but from the extensive French possessions which extend to the north, south and east of this region, in consequence of which they represent considerable tribal and even some physical diversity; nevertheless these differences are but superficial. Their transformation into French soldiers meant a complete transformation of their life, and many of them before being recruited had never seen a white man. Their mentality as observed in France is of considerable interest. The essential traits shown are naïveness, lack of reflection, lack of curiosity, good disposition, and indolence. Discipline and their own "sangfroid" and valor make of them, however, soldiers of the first order, so long as it is merely a question of fighting; but their feeble judgment and inadaptability to complex conditions render them awkward and even dangerous when initiative becomes necessary. They become readily confused or inefficient under new requirements. On the other hand they are quite capable of commanding their own comrades as under-officers. They are "eminently sympathetic," and it will be the duty of France after the war to extend to them all possible enlightenment.

INTELLIGENCE OF IMMIGRANTS. By Goddard (Henry H.)—*J. of Delinq.*, Sept., 1917, II, 243-278. Reviewed in *J. Hered.*, Wash., Dec., 1917, 554-556.

Report on mental tests of a series of steerage immigrants. The results indicate subaverage intelligence in a large proportion of cases. But the condition does not seem in general to be one of pathological nature and judging from previous experiences in this country with similar classes of immigrants there appears to be but little danger of an increase of feeble-mindedness in the American population as a result.

MENTALITY OF THE ARRIVING IMMIGRANT. By Mullan (E. H.)—*Public Health Bull. No. 90, U. S. Pub. Health Service, Wash., 8°, 1917, 1-132.*

Exhaustive report on detailed mental tests of 296 immigrants, literate and illiterate, of different nationalities. The tests are described and their results given with each subject. Among the number were found three feeble-minded (1 per cent) and eight suspected of some degree of feeble-mindedness. The studies have not been extensive enough to definitely establish differences in mental standards between the various nationalities, but there are some interesting indications. The author very properly calls attention to the difficulties and uncertainties of such work. "Normal aliens at the time of landing are in a peculiar mental state. Many of them have come from rural districts where opportunities have been meager; they have parted from their relatives and friends; they have undergone a long voyage, perhaps suffering many hardships; they are anxious to land and to meet relatives. Therefore, their mental condition has been partly shaped by all these circumstances; and if they are questioned or given mental tasks to perform at the time of arrival it is to be expected that their replies and general behavior will not be the same as would be obtained under other conditions." /

DEMOGRAPHY: VITAL STATISTICS

THE SIGNIFICANCE OF THE DECLINING BIRTH RATE. By Dublin (Louis I.)—*Science, Mar. 1, 1918, 201-210.*

In his address as retiring Vice President of Section I of the American Association for the Advancement of Science, Dr. Louis I. Dublin emphasizes strongly the increasing menace of the declining birth rate in America. He presents the situation for France, showing the effect of the declining birth rate, not only on the gross total of population but also on its internal structure. The youth and strength of France form a much smaller part of its population than they did about a century ago, while its old and its dependents form a larger part. He found similar, though less pronounced, conditions in England.

Although, superficially, the facts for the United States present a not unfavorable picture, closer analysis shows that there has been a marked and continuous decline in the birth rate for a period of years, and that this reduction is most in evidence among our native population, and particularly among those who are best fitted, economically, socially, and intellectually, to raise a family.

That the State is largely at fault in this matter is clear. The writer urges the revision of our educational systems so that higher national ideals will be inculcated. Above all, our women must be educated for their place as mothers. Provision should also be made to reward, either financially, or at least with esteem, the women who, realizing their obligations, are willing to bring up families of normal size. In conclusion Dr. Dublin emphasizes the need for birth release among the healthy and normal people of our country as a primary national duty.—L. I. D.

MIGRATION OF NEGROES INTO NORTHERN CITIES. With discussion. By Haynes (G. E.)—*Proc. Nat. Conference of Social Work*, 44 Ses., 8°, Chic., 1918, 494-503.

"This movement of Negroes, while it is larger and more widespread due to the present unusual conditions, has been going on for the past three or four decades." The causes have been economic, similar to those that "are moving large numbers of the white population from the South into northern cities;" and social, the northern cities offering the Negro greater security, less discrimination, better schooling facilities for his children. "The Negro is feeling his way toward a better and larger life." This movement to and settlement of Negroes in northern cities is not a temporary migration, but a resettlement; and is likely to continue for an indefinite period.

LA REPOPULATION FRANÇAISE. By Picard (Emile)—*Revue des Deux Mondes*, Paris, Janv. 15, 1917, 372-388.

The article presents in brief but impressive form the well known plight of France, the failing reproduction of the population. The causes of this are now well understood, and the main has been voluntary restriction. The results have been disastrous to France as a nation; it has numerically remained almost stationary in population, while all of its neighbors, and particularly Germany, advanced. Had this not been so and had France in 1914 possessed 15 to 20 million more inhabitants, the present terrible war, which brought France so near to disaster, would not have taken place. The principal causes of the voluntary restriction of birth rate are egotism, thirst for pleasure, fears of the efforts necessary to raise a large family, and economic conditions.

The cure of the evil will lie in the most careful attention to these causes and in the enlightened and effective employment of all possible remedies, one of the main of which will be a change in the general mental attitude of the population on this question.

STUDIES IN THE SEX-RATIO IN MAN. By Schultz (Adolf H.)—*Biolog. Bull.*, 1918, XXXIV, 257-275.

The paper presents a brief outline of the sex-ratio of adults or tertiary sex-ratio, and that of newborns (or secondary sex-ratio), with their changes through unequal mortality of the two sexes. In the attempt to solve the problem of the primary sex-ratio—that is, the sex-ratio at conception—the relative frequency of abortions and stillbirths, and the sex-ratio of these, were determined by means of the embryological collection of the Carnegie Institution and of material gathered from the scattered literature on these subjects. The following approximate averages were obtained: For each 100 living born with the sex-ratio of 105.5 males to 100 females, there occur, in the eighth to tenth month, 4 stillborn with sex-ratio 130; fourth to seventh month, 9 abortions with sex-ratio 106.3; and 0 to third month, 14 abortions with sex-ratio 125. The total gives 127 conceptions, with the primary sex-ratio of 108.47.

The proportionate intrauterine mortality of males is higher than that of living fetuses.

A review of the literature concerning the determination of and changes in the primary sex-ratio is given. In the critical discussion of the great number of papers dealing with changes in the sex-ratio of newborns it is shown that most of the factors claimed to affect the ratio, such as pelvic diameters of the mother, Jewish race, social class, illegitimacy, war and so on, are not sex-determining but sex-eliminating; i.e., they increase or decrease the relative frequency of abortions and stillbirths of males, thus causing the primary sex-ratio to change to a greater or lesser degree during pregnancy.—A. H. S.

ABNORMAL CLASSES

A STUDY OF SEVENTY-FIVE DELINQUENT GIRLS. By Bowler (Alida C.). *J. Delinq.*, May, 1917, II, No. 3, 156-168.

The studies led the author to the conclusion that—

"(1) A certain percentage of the delinquent girls are so defective as to be quite incapable of self-management.

"(2) Time, money and valuable effort are being wasted in the hopeless task of trying to develop what simply is not in them.

"(3) These girls are prolific and if, at 21 years of age or earlier, they are returned to the society whence they came, they bear offspring who become in turn the problem and the burden of the next generation."

CRIMINAL SOCIOLOGY. By Ferri (Enrico)—8°, Boston, 1917, XLIII + 577 pp.

Translation from the latest French edition (1905) of the well-known treatise on criminology, the first Italian edition of which appeared in 1884. Chapters I and II deal with criminal anthropology.

THE EXCEPTIONAL CHILD. By Groszmann (M. P. E.)—12mo, N. Y., 1917, 764 pp.

The term "exceptional" child is used by the author "for all types of deviation from the 'average,'" and the purpose of the book "is to give a perspective of the entire situation, and to suggest ways and means of coping with the problem in its various aspects."

The problem of the exceptional child, "is really a problem of civilization itself—that it goes to the very root of the tree of human life; that upon its solution depends the progress, yea the very existence of the race. If it is not solved in a sane and constructive manner our present civilization will be swept away as other civilizations have perished in the past, to give way to new, raw attempts, by untried races, to build up a better human society than there was before."

The book is written in simple language, and pays attention in the main to the mental qualities of the child. Anthropological examination is utilized but slightly—much less than would be useful. An extensive selected bibliography is added to the volume.

A STUDY OF FORTY-NINE FEMALE CONVICTS (23 white, 26 negro). By Ordahl (Louise E.) and Ordahl (Geo.)—*J. Delinq.*, 1917, II, 331-351.

The main interest of this study to anthropology lies in the comparison of the mentalities of the two racial groups. As to the offense, crime against human life was committed by 42 per cent of the white and 62 per cent of the negro; crimes chiefly against property, by 58 per cent of the white and 38 per cent of the negro women. The mental tests of the two groups showed as follows: Normal, white, 13 per cent; negro, 0 per cent; dull normal, white, 4 per cent; negro, 8 per cent; borderline, white, 56 per cent; negro, 66 per cent; and feeble-minded, white, 26 per cent; negro 31 per cent.

A STUDY OF FIFTY FEEBLE-MINDED PROSTITUTES. By Paddon (Mary E.)—*J. Delinq.*, 1918, III, No. 1, 1-11.

The percentage of feeble-minded (moron, imbecile) among prostitutes in this country who have come in conflict with the law varies, according to previous reports, from 29 to 97 per cent; unless, however, a careful test be made of every prostitute, clandestine as well as professional, the exact conditions in this respect can not be fully known. The fifty subjects studied by the author were all self-confessed or court-convicted cases, ranging in age from 17 to 32. Their mental age, as determined by the Binet scale, was found to correspond, in 2 to that of a 5-year normal child; in 10 to 7 years; in 14 to 8 years; in 20 to 9 years; in 4 to 10 years; and none above. A large majority (62 per cent) came from families of "a decided downward trend," and nearly all showed inferior school and occupational record, with various mental or emotional irregularities. "In conclusion, it seems reasonable to say that the feeble-minded girl has many characteristics which make her a likely recruit to the ranks of prostitution, and that as a prostitute, her low mentality makes her, if possible, a greater menace to society than her more intelligent sister, because her low intelligence makes her less careful in caring for herself physically, and because this same stupidity makes her become the mother of illegitimate children approximately three times as often as the mentally normal prostitute."

A SURVEY OF MENTAL DEFECTIVES. By Rosanoff (A. J.)—*Proc. Nat. Conference of Social Work*, 44 Ses., 8^o, Chic., 1918, 421-428.

On July 1, 1916, an enumeration of cases of mental disorder, both in and out of institutions, was undertaken in Nassau County, New York. The total population of the county, in 1915, was 115,827; the number of "abnormals" found, exclusive of the schools, was 1,592, or 1.37 per cent, while 583 additional cases were "doubtful." By including an estimated number of abnormal children found in the public schools, the percentage of abnormals would be 1.72. The cases outside of the schools were divisible into four main groups, namely: the insane, 25 per cent; the epileptic, 4.5 per cent; the feeble-minded, 40 per cent; and other constitutionally inferiors (alcoholics, criminals, prostitutes, chronic dependents, etc.), 31 per cent. Nearly 60 per cent of these 1,592 cases were in need of institutional treatment. The State of New York had, in 1910, 3.96 persons per 1,000

population in institutions for the insane, epileptic, feeble-minded, etc., but "the material brought to light in the course of the Nassau County survey shows that, by a most conservative judgment, the State could double its institutional provision without the slightest danger of such increased provision proving to be in excess of actual needs." Many of the lighter cases, especially among children, receive little or no proper attention.

Feeble-Mindedness and Crime in Oregon. By Thacher (George A.)—*J. Delinq.*, July, 1917, II, No. 4, 211-224.

"Within the past four years there has come in Oregon a partial recognition of the fact that many persons charged with crime belong in the ranks of the high-grade, or moron class, of the feeble-minded."

"Since May 21, 1917, Oregon has had a commitment law providing indeterminate detention for the feeble-minded with a provision for parole where bonds are given for the proper supervision of the paroled feeble-minded person. Feeble-minded persons convicted of crime are saved from the infliction of a punishment measured by the offense, and are committed to the institution for the feeble-minded.

"Since May 21, 1917, Oregon has had a sterilization law, applying only, however, to inmates of the penitentiary, asylum for insane, and institution for feeble-minded. Of course it is the defectives outside of institutions that the public have cause to dread in the matter of breeding, not only because of expense but as a cause of human suffering. Witness the case of feeble-minded Bill in both connections."

Delinquency and Density of Population. By Williams (J. Harold)—*J. Delinq.*, March, 1917, II, No. 2, 74-91.

There is a prevalent belief that crime and delinquency are largely problems of the more densely populated regions, although recent investigations have shown that there may be relatively as much if not more unsocial conduct in the smaller communities. A study of 150 delinquent boys committed to the Whittier State School has led the author to advance the following conclusions, so far as concerns delinquent boys in California:

"(1) That delinquency is more prevalent in small towns, and least prevalent in the open rural country as judged by the relative number of commitments. There is an inverse ratio between the population of incorporated places and the proportion of delinquent boys committed from them.

"(2) That no particular offense or group of offenses committed by delinquent boys are especially associated with city, town or rural population.

"(3) That the average level of intelligence is higher in delinquent boys from the cities than in those from the towns and rural districts. The proportion of feeble-mindedness is greatest in those from the rural districts.

"(4) The median age for boys committed to the Whittier State School is 14 years in all population groups.

"(5) Delinquent boys from the city show better school progress than rural and town delinquents."

THE AMERICAN INDIAN

TWENTY-NINTH ANNUAL ARCHAEOLOGICAL REPORT, 1917. By Orr (R. B.)—Part of Appendix to the Report of the Minister of Educ., Ontario, Toronto, 1917, 1-117.

Besides several interesting articles, most especially that on "The Nipissings," with reproduction of a portrait of Jean Nicolet, and two old maps, the Report gives notes (pp. 98-102) on a series of Indian ossuaries in Ontario, by Col. George E. Laidlaw. The contents of many of these ossuaries, which represent the well-known periodical communal burials of the eastern Algonquian tribes, have unfortunately been dispersed or otherwise lost to science; in some, however, there may still remain valuable material. One of these pits, discovered accidentally in the early forties of the past century in Durham County, was calculated "to contain from 800 to 1,000 skeletons."

It is to be regretted that the otherwise highly creditable Report is marred by an article on "Earth's First Man," by the Very Rev. W. R. Harris, which is like an echo from the medieval age.

REMNANTS OF THE NEHANTICS. By Speck (Frank G.)—*The Southern Workman*, Feb. 1918, 65-69.

The Nehantics were one of the tribes of eastern Connecticut most frequently mentioned in historical records. Their territory extended along the Sound, from the Pancatuc almost to the Connecticut River. At present the tribe is represented in Connecticut by no more than ten descendants of partly Mohegan [and partly white] blood, and in the West among the Brotherton Indians of Wisconsin by some mixed-blood families which were rated some years ago as being Nehantic descendants.

II. WAR ANTHROPOLOGY

PEOPLES AT WAR

THE AMERICAN NEGRO IN THE WAR. Edit., *The Southern Workman*, Feb. 1918, 54.

A Division of the National Army "is now being formed from Negroes of the selective draft. It will include four regiments of infantry, three of artillery, and one of engineers, besides signal corps, machine-gun, and other auxilliary organizations."

THE AMERICAN INDIAN IN THE WORLD WAR. By Parker (A. C.)—*The Southern Workman*, Feb. 1918, 61-63.

Both Canadian and United States Indians have in general proven patriotic and many have joined the armies. In the United States, "perhaps the most important factor promoting the enlistment of Indians in the army has been the methodical military training given for many years to Indian boys and girls in the Indian boarding schools." Many Indians volunteered upon learning of the German atrocities; and

scores of them are holding responsible positions. Every branch of service is found to have appealed to the Indian, including aviation. Within a year the writer estimates there will be fully 5,000 of them in army service, besides those in coördinate branches. There are to be no separate Indian units and no race distinction.

ALBANIA AND THE ALBANIANS. By Woods (H. Chas.)—*The Geogr. Rev.*, April, 1918, 257-273.

The paper is a general but first-hand account of Albania and its people, with notes on the political conditions of the country. No attempt is made to contribute to the anthropological problems of the Albanians. They are "warlike, lawless," but with a strict code of honor, and very faithful. They are divided into two main groups, the Ghegs or north Albanians, and the Tosks, who occupy the southern parts of the country. The Ghegs are "in their turn made up of a number of warlike tribes, many of whom still live a feudal life." The Tosks are more civilized and perhaps less warlike, and their tribal system is much less well defined.

RACIAL PROBLEMS AND EFFECTS OF THE WAR

PROBLÈMES MÉDICAUX D'APRÈS-GUERRE. LA CONSERVATION DE LA RACE. By Apert (Eugene)—*Le Monde méd.*, Par., 1916, XXV, 4-13.

The author discusses the probable effects on French progeny and nation of the various classes of wounds and diseases suffered by the soldiers. As to wounds in general, those of the most serious consequences to the individual and possibly to his descendants are grave injuries of the central nervous system. As to acquired diseases (not considering syphilis), the author believes that their consequences are not to be much feared, provided they occur in persons of good strength and constitutions.

On the whole, the conclusions he reaches are reassuring. Even though the injury to the French youth during this war be severe, it is possible to foresee that, if all proper measures be taken to counteract and repair the losses, they will not seriously and permanently affect the quality of the race. Many years, however, will be necessary to reach these compensatory results, and they can only be realized if at the same time there shall take place certain changes in the mental attitude of the population, particularly in respect to the desirability of larger families. There are good indications that such a change is already taking place, not only in the legislative chambers but also in the nation at large; it is again becoming fashionable to have numerous children. France, supplemented by its lost provinces, will after the war start a new era of life. If it recuperated after the defeats of 1815 and 1870 it may safely be predicted that after the present war, under the effects of the supreme balm of final victory; the wounds will heal even more rapidly.

LOSSES OF LIFE IN MODERN WARS. By Bodart (Gaston)—Published by the Carnegie Endow. for Internat. Peace, Oxford, 8 vo, 1916, 156 pp.

The author gives various statistics on the losses of life in war by the principal European nations since 1614. Taking the time from 1792 to 1914, France "of all the nations of the world, has made the largest sacrifices of human life" on the field of battle. And as the losses of a large number of the youth of a country, exterminated either in battle or by disease and hardships, must surely and inevitably affect the population, the author ranges himself "on the side of those who affirm that war has had its large share in producing the present stagnation or even decrease in the French population."

EUGENICS DURING AND AFTER THE WAR. By Darwin (Leonard)—*Eug. Rev.*, July 1915, VII, 91-106. Presidential address, Eugenics Education Society, 1915.

This excellent article, though not recent, is well worthy to be recalled in this place.

Interest in eugenic problems raised by the war is very keen; the racial effects of war, however, and of training for war differ substantially and require a separate treatment. As peace is now never brought about, as in the far past, by the wholesale slaughter of the foe, "it is evident that civilisation has greatly reduced the selective effects of war." No far-reaching racial results are necessarily produced by a transfer of territory. The eugenists, however, must also take into account the relative effect of the war on the subsequent rates of multiplication of the nations concerned. "To sum up, the racial results of one nation vanquishing another, which are exceedingly difficult to predict, are certainly less than was formerly the case, whilst the qualities fostered now seem nearly as likely to be bad as to be good. . . .

"In short, as regards the racial qualities of future generations, and putting aside the differential racial effects as between the victorious and the vanquished nations as being of far less importance, primitive warfare was terrible though in some ways beneficial, whilst modern war is more terrible and utterly and entirely harmful."

What ought the eugenists advocate in view of this anticipated damage to the racial qualities of future generations? The chances of a total abolition of war in the future are very small. Under the conscription system, however, future wars will produce less injury to the race than those based on the volunteer systems. A convention which would prevent wounded men from again fighting in the same campaign would be highly eugenic. And at the conclusion of hostilities every encouragement should be given to those who return to settle down in married life, in order to promote the reappearance of their manly qualities in the coming generations. Finally the injurious indirect effects of hostilities of population as a whole should as far as possible be mitigated.

The racial effect of training for war in time of peace deserves careful consideration. "Military training certainly makes men more strong

and healthy for the time being, and probably permanently;" and their physical fitness will make them both more attractive to the other sex and more useful as breadwinners. Against this must be set the effect of their removal from normal surroundings, the increased risk of specific diseases, and the higher deathrate of the men when serving abroad. Military training in time of peace, therefore, appears to be eugenic if the men are only kept with the colors for short periods. In the case of officers who must be trained for a long time, special efforts should be made to promote marriage and reproduction.

Among the after effects of the war and as a result of the great wastage of life, measures favoring a general increase in the birth rate may be anticipated, and the problem of racial effect of all reforms relating to this question should be carefully studied. What is needed "is a rise in quality far more than increase in mere quantity. . . . From whatever point of view we regard this matter we see that our great effort should be aimed at raising the level of future generations," rather than at a mere increase in numbers. It is, however, difficult to predict success in either direction. Yet all possible measures should be taken to produce after the war a more rapid rate of multiplication of the best elements of the English population. In many matters of this nature "the appeals of women are likely to be far more effective than anything that a man can say; because the burden of parenthood must ever fall more heavily on women than on men."

WAR AND THE BIRTH-RATE. By Ellis (Havelock)—*The Nation*, Sept. 25, 1915, XVII, 829-831.

The motive of this article is a strong plea for a future general limitation of birth rate. The author looks, and it must be said with much justification, upon the high birth rate of Germany during the several decades preceding the war as the main cause of the present world conflict. The objection that conscious birth control affects the social classes unequally and that it is especially practiced by the best classes in the community, he meets with the opinion that "all social movements tend to begin at the top, and to permeate downward." Besides, "the movement is already well marked among the working classes, and has only failed to touch the lowest social stratum of all, too weak-minded and too reckless to be amenable to ordinary social motives." The great war has brought home, as never before, the gravity of the problem of birth-rate excess. "It has ever been so, the expanding nation has always been a menace to the world and to itself. The arrest of the falling birth rate, it cannot be too often repeated, would be the arrest of all civilization and all humanity."

ESSAYS IN WAR-TIME. By Ellis (Havelock)—12 mo, Lond., 1917, 252 pp.

A noteworthy book by this well-known author, dealing with Evolution and War; War and Eugenics; War and the Birth-rate; Femininism and Masculinism; the Conquest of Venereal Disease; the Nationalization of

Health; Civilization and Birth-rate; Birth Control; and other related problems.

To review this work in detail would be a large task. It contains much sound philosophy, and deals with many social-anthropological problems. Its somewhat general nature may fail to fully satisfy the special student of these questions, but even in such a case it leaves much food for reflection. A few of the fundamental thoughts of the author are: "War is not a permanent factor of national evolution, but for the most part has no place in Nature at all; it has played a part in the early development of primitive human society, but, as savagery passes into civilisation its beneficial effects are lost." The question as to exactly what are the measurable effects of war on the civilized human breed cannot be decided except on a foundation of cold and hard facts, of which we are not as yet in full possession. Its temporary effects, the diminution of the male population and diminished births, are well ascertained. Nearly all the ways, however, in which wars and armies disturb the normal course of affairs seem likely to interfere with eugenical breeding, and none to favor it. The opposite belief, or that in the beneficial effect of war on the race, has been held chiefly in Germany. Fortunately, "war is diminishing, and will one day disappear as completely as the mediaeval scourge of the Black Death."

As to sex questions, the author holds that "the mental diversity of men and women is equally fundamental. It is rooted in organisation. The well-intentioned efforts of many pioneers in women's movements to treat men and women as identical, and, as it were, to force women into masculine moulds, were both mischievous and useless. Women will always be different from men, mentally as well as physically."

The main theme of the book, however, is the question of birth rate and its control. In the three sections devoted to this subject the author repeats in plain form his well-known views on this question. He is unqualifiedly in favor of sensible birth-rate restriction. "The arrest of the falling birth-rate, it cannot be too often repeated, would be the arrest of all civilisation and of all humanity;" and "the leadership in civilisation belongs not to the nation with the highest birth-rate but to the nation which has learnt to produce the finest men and women." The regulation of the birth rate "is a vital social problem concerning which we cannot afford to be indifferent." There is no desire to exaggerate the importance of birth control. It is not a royal road to the millennium, and, like all other measures which the course of progress forces us to adopt, it has its disadvantages. Yet at the present moment its real and vital significance is acutely brought home to us. The great and only legitimate apology which has been put forward for the aggressive attitude of Germany in the present war has been that it was the inevitable expansive outcome of the abnormally high birth rate of Germany in recent times. There was no outlet but a devastating war. A similar state of affairs in the future should be avoided.

CONFÉRENCE INTERALLIÉE POUR L'ÉTUDE DE LA RÉÉCUDATION PROFESSIONNELLE ET DES QUESTIONS QUI INTÉRESSENT LES INVALIDES DE LA GUERRE. Paris, Mai 8-12, 1917. Rapports, 8°, Paris, 1917, 462 pp.

In the main of sociological concern, yet indirectly also of anthropological interest. Effective restoration and consequent economical well-being of the badly wounded can not but have also beneficial influence on marriage of such individuals and raising by them of more numerous as well as better cared for families than would otherwise be the case. The problems that were dealt with by this Conference will soon present themselves with increasing force also in this country.

THE FUTURE OF THE DISABLED SOLDIER. By Hutt (C. W.).—N. Y., 1917, 199 pp.

This little volume may be said to present a bird's-eye view of the entire system of rehabilitation and reeducation as it has been evolved to meet the exigencies of the present war. Because of its condensed and tangible presentation of the subject it will prove a valuable introduction to the more technical and intricate study of this important phase of war work. Chapters are devoted to the following: 1. Arrangements for treatment. Methods adopted for the restoration of the health and the industrial efficiency of the disabled. 2. Training of the disabled abroad. The provisions of training and employment for the disabled sailor or soldier in France, Germany, Canada, Australia, New Zealand. 3. Training of the disabled in the United Kingdom. 4. Occupation and physical defect, which deals with the selection of employment suitable to the various kinds of disability. 5. Employment of the disabled in the United Kingdom.

A particularly valuable part of the volume for those who are taking up the study of rehabilitation and reeducation is comprised in the various appendices, which contain, among other data, lists of hospitals and schools, and other facilities for the treatment and training of the disabled, and of occupations suitable for the different classes of defectives. (Conf. Bull. Off. of the Surg. Gen. U. S. A., II, 1918.)

THE WAR CRIPPLE. By McMurtrie (D. C.).—*Columbia War Papers*, Ser. I, No. 17, N. Y., 1917, 30 pp.

This admirably written paper is primarily of sociological rather than anthropological interest, but deserves well to be mentioned in this place.

"One of the major costs of war consists in the thousands of crippled and disabled men which are left in its train. In the past, such soldiers have been indemnified for their injuries—and insufficiently at best—by pension bounty or admission to soldiers' homes. In either instance they have been relegated to a life of idleness and dependence. These circumstances tend to make for general demoralization, and the popular conception of the adult cripple as lazy, ill-mannered, and intemperate has too often had considerable basis of experience. This situation has been regarded as unfortunate but inevitable. The cripple has been

considered as a helpless member of society, to be pitied and maintained, but to whom constructive assistance was not feasible. This attitude is in process of change, for it has been demonstrated that the cripple, though debarred by his handicap from some occupations, could, almost without exception, be fitted by special training for some trades in which he could become self-supporting in spite of his disability."

The solution of the problem exists in schools for the reeducation of the crippled victims. "The provision of training for disabled men received a tremendous impetus at the opening of the present war. With the call of the able-bodied population to arms, the ensuing shortage of labor necessitated the draft into industry of women and old men. No potential productivity could be neglected, and the rehabilitation of the physically disabled became a national necessity. The dictates of national gratitude and national economy in this instance coincided, and in conjunction have stimulated extensive and vigorous activity."

"There are now hundreds of points in the belligerent countries at which provision is made for both the present and future needs of the crippled soldier."

POPULATION AND WAR. By Hutter (S.)—*Military Hist. and Econ.*, Cambridge, Mass., Oct. 1917, II, No. 4, 385-391.

Among the fundamental factors underlying the present great war "none is more interesting than what centers about population—its growth, its density, its distribution. . . . The war power of a country measures up in terms, not of numbers, but of density of population. Where the population is dense we inevitably find, in a modern state, great industrial centres with all the war power that is incidental to the factory, the means for manufacturing the implements of war and the great arteries of communication which quicken and energize national war power." The agricultural states such as Russia, while strong in their capacity to resist invasion, are weak to wage war.

Another important aspect of population is that of its increase. An increase in population disproportionate to that of other countries, with other conditions equal, can well be assumed to precipitate war. It is well known that since 1870 the population of Germany increased very materially, while that of France remained almost stationary. "The stake in the present war is not only for future means of industrial expansion, but also population. And it is the latent realization of this fact, the deep seated instinct of the mass as well as of the individual to propagate and expand, that causes the people of the belligerent countries to make such cruel sacrifices to continue the war."

WHY SHOULD WE HAVE UNIVERSAL MILITARY SERVICE? Compiled from writings of Munroe Smith, Franklin H. Giddings, Frederic Louis Huidekoper and General Emory Upton—*Columbia War Papers*, Ser. I, No. 13, 12 mo, N. Y., 1917, 36 pp.

While the paper, as the rest of the series, is more of popular than strictly scientific nature, it includes observations which touch close upon

anthropology and deserve to be mentioned. They are embodied in the part written by Dr. Smith, Professor of Comparative Jurisprudence at the Columbia University, and relate to the objections, from what is really the anthropological standpoint, to volunteer armies in this country. The author is of the opinion that, "The most serious objections to relying upon volunteer armies are not political. . . . It is one of the greatest evils of war that it spares those who are physically defective and confines its ravages to those who are physically sound. It is the greatest evil of the volunteer system that it slays or maims those who are most energetic and enterprising, who have the highest courage and the warmest devotion to their country, while it spares the inert, the timid and the selfish. If modern war makes in any case for the survival of the physically unfit, modern war waged by volunteer armies makes for the survival of the socially unfit."

Generalizations of this nature, whether directed toward the physical or social aspect of the case, even if subject to exceptions, deserve serious attention.

MILITARY SELECTION AND RACE DETERIORATION. By Kellogg (Vernon Lyman)—Published by Carnegie Endow. for Internat. Peace, Oxford, 1916, 159-202.

This, one of the most elaborate papers on the subject, "presents some of the results of a special study made of the conditions and results attending military selection with particular regard to their relation to possible race injury or race betterment. For there have been not only writers to criticize the claim that militarism injures the race, but writers to claim that it actually betters the race. The study, as undertaken by the present writer, is made primarily from the point of view of the biologist concerned with changes in actual racial heredity rather than with changes in social heritage or race tradition."

The Army represents a group of individuals not chosen at random from the population, but selected first for sex, then for age, and finally for stature, strength, and freedom from infirmity and pathological conditions. A large standing army results in the temporary or permanent removal from the general population of a special in many respects most fit part of it, and the deliberate exposure of this part of it to death and disease. "And for each of these men so removed from the general population, at least one other man, falling below this standard, has been retained in the civil population." All this establishes "a military selection, whereby a most desirable element of the population is restrained from contributing its full and its particularly important influence in the determination, through heredity, of the racial standard of the population."

What happens to the soldiers? In the first place "disease reaps an inevitable harvest from the armies in times of war. . . . much greater than the death-rate for the same time in the civil population;" and there is the mortality due to the war itself. But great mortality in itself would not necessarily be a great racial catastrophe. The impor-

tant thing is the character of the selection which this mortality determines. Most diseases, it is true, will select especially the weaker and less immune; yet the lessening of numbers "may well be looked on as a calamity outweighing the advantage." Besides this, however, militarism fosters the acquisition of venereal diseases, which "are of great possibilities and importance in relation to racial deterioration." The mortality due to violent causes, however, is non-selective, or selective of the best, and "its influence, to whatever extent it exists, is all dysgenic in effect." In addition, protracted and exhausting wars become further injurious in their effect, through the long exposure and strain of the men, tending to injure even the best of the group. These facts, "added to our biological knowledge of heredity and the method of the production of racial modifications through selection and inheritance, tend strongly to create a presumption in favour of the probability of the racially disadvantageous working of exaggerated militarism."

An examination of earlier French records led the author to the belief that the oft-discussed diminution of stature among the French men as a result of the Napoleonic wars had actually taken place, to be followed later on, "in the later 1830's and 1840's, to a height one inch greater than that of the earlier generations born in war-time."

To summarize, "the recruiting of soldiers from the general population both by the methods of voluntary enlistment and of compulsory service and conscription, results in the rejection back into the general (civil) population of just about one-half of the young men offering themselves voluntarily or forming the annual classes reaching the military age, for physical unfitness (undersize or infirmities and disease), and the acceptance and taking out temporarily or, in case of death in war, permanently from the general population of the other half of these groups of young men. These groups form a fraction of varying size of the general population especially characterized by good physical development and vigour. This selected fraction is then prevented for a longer or shorter time from taking part in the reproduction of the population and is deliberately exposed to the extinguishing and weakening effects of war, if war comes, and whether war comes or not, to an unusual degree of danger of contracting certain race-deteriorating diseases. The men rejected as unfit for service in the army and retained in the civil population are given, therefore, special opportunity and importance in the reproduction of the population. Thus the methods of the selection of soldiers and the condition of the maintenance of armies combine to form a positive factor of race-deterioration."

THE AMERICAN COLLEGE AND THE GREAT WAR. By Kelly (R. L.)—*Scribner's Magazine*, Jan. 1918, 77-83.

The author (Executive Secretary of the Council of Church Board of Education in the United States) shows in this well-written article how amply the colleges responded to the call of the nation. While accurate figures are not yet available, it is known that the numbers of volunteers for all branches of service from among the students as well as the teach-

ing staffs was such as to arouse fear that the colleges would be depopulated. The total of student volunteers contributed by the 567 colleges of the country during 1917 can be estimated at more than 45,000. Yale alone sent 832, Wisconsin 790, and others in proportion. Of the faculties, Colorado furnished 54 for war service; the University of Chicago, the Northwestern and the University of Louisville, each 50; the University of Wisconsin, 74.

The important anthropological problem in this connection will be the waste from this physically as well as mentally and socially highly selected and valuable class of men. All that can be said now is that, except perhaps in aviation and the ambulance service, the students and instructors will almost invariably act in the capacity of officers, and that a very large proportion will be in active service, where the danger is at its maximum.

It is very desirable that reliable and complete war statistics of this class of men be some day furnished.

KÖRPERMASZ UND KÖRPERPROPORTION IM ZUSAMMENHANG MIT ENTWICKLUNG, WACHSTUM UND FUNKTION ALS GEGESTAND DER KONSTITUTIONSLEHRE. Die Militärärztliche Sachverständigentätigkeit a.d. Gebiete d. Ersatzwesens u. d. militärischen Versorgung. By Kraus (F.)—8°, Jena, 1917. II, 241-296.

The article deals with the subject of body proportions in connection with evolution, growth, function and constitution of the individual, and with the value of special constitutions in the war.

The article is written in a rather involved way and is not easily read or digested; but the gist of it is the calling of attention by the author, in connection with the examination of recruits for the German army, to the usefulness of applied or what he calls "clinical" anthropology. He believes that the outward form and proportions of body correspond to the status and vitality of the internal organs, that they thus have an important bearing on the potentiality of the recruit, and that therefore they deserve careful consideration by the medical examiners. Prematurely advanced statures and excessive statures are in general rather pathological than physiological manifestations, and such individuals, it has been repeatedly proven during the war in Germany, are weaker than others. Recruits of this nature "in their eighteenth year are generally as yet unripe."

JUVENILE CRIME AND THE WAR. By Terman (Lewis M.)—*J. Delinq.*, May, 1917, II, No. 3, 169-171.

The author quotes a note on this subject, which is becoming one of serious interest to probably all the European nations at war, from the March number of *The Child*, a well known English journal on child welfare. The article points to the increased prevalence of juvenile offenses involving both boys and girls, and discusses the causes, which may be briefly summarized as decreased control of the young, with increased opportunities to do mischief, together with the more or less

abnormal excited mental state of mind due to the journalistic reports of the war and other agencies.

A valuable contribution to the rapidly growing literature on the subject, by C. E. B. Russell, has recently been issued as No. 1 of the "Barnett House Papers," by the Oxford University Press, under the title of "The Problem of Juvenile Crime." Reports similar to those from England, though less definite, are coming from Germany and Austria. About France and Russia information is not yet available. A similar increase in juvenile delinquency in the United States is unlikely; yet some increase is not impossible, and steps should be taken early to counteract it.

THE FUTURE OF AMERICAN CHILDHOOD IN RELATION TO THE WAR. By Lovejoy (Owen R.)—Proc. Nat. Conference of Social Work, 44 Ses., 8°, Chic., 1918, 268-273.

The article calls attention to the necessity of safeguarding the American child during the war. In the European countries at war, the child suffers severely. "Reports show that children are drawing on their strength, are being worked out," at the expense of their vitality; and that they are being neglected, with consequent great increase in juvenile delinquency. It is imperative that, whatever the conditions, the physical and mental development of the American child be safeguarded.

EUGENIC PROBLEMS AFTER THE GREAT WAR. By Poulton (E. B.)—The Galton Lecture, Feb. 16, 1916. *Eug. Rev.*, April, 1916, VIII, 34-49.

"The first problem before us is to win the war and prevent 'the most stupendously interesting step of human evolution' from carrying the world backwards to lower and more brutal ideals, favoring the success and increase of lower and more brutal types of man. Having won the war we must act so as to prevent any such danger from threatening civilization a second time." Within the nation there will be a necessity for "state action based directly on eugenic considerations." The chief eugenic problems which will confront the nation at the end of the war are thus recapitulated by the author:

"(1) Security from the menace of low ideals; such security only attainable by universal service and the scientific classification and use of our population.

"(2) Special care, encouraged by the state and society, of the generation that is too young to take part in the war, never forgetting the extraordinary powers that will then be possessed by the agencies through which racial qualities are improved or impaired.

"(3) The creation of an atmosphere favorable to science, a condition essential for full success in solving the problems stated above.

"(4) In securing necessary reforms to hold fast to the strong and admirable features in our existing systems of education and administration."

EUGENICS AND WAR. By Thomson (J. Arthur)—The Second Galton Lecture, delivered Feb. 16, 1915. *Eug. Rev.*, Apr. 1915, VII, 1-14; also *Pop. Sci. Monthly*, May, 1915, 417-427.

An excellent paper, dealing with the probable results of the present war on the race. As to the nature of these results the author is not very sanguine. War, "biologically regarded," means vast wastage and the reversal of eugenic or racial selection, since it prunes off a disproportionately large number of those whom the race can least afford to lose."

"If the war is sifting out from the possible parent-stock of the future a larger proportion of those who are relatively more fit from an evolutionary or eugenic point of view, what is possible in the way of counter-active?"

Three hopeful considerations may be referred to:

"(1) The war is likely to demonstrate the value of constitutions which can endure without stolidity, which have resiliency without 'nerves.' We may look forward to a heightening of the standard of all-round fitness.

"(2) In the second place this is a time of vivid national self-consciousness and of freshened idealism, and it is possible that the spiritual momentum of this may enable us to go ahead.

"(3) A third consideration, also full of hope, is that one of the almost certain results of the war will be increased approachment of the English peoples."

The author concludes: "We cannot end without expressing the hope that even if the natural inheritance of our race must suffer impoverishment through the tragic sifting of this most terrible war, we shall win through in the end with our social heritage enriched."

ECONOMIC CONDITIONS AND THE BIRTH-RATE AFTER THE WAR. By Wolfe (A. B.)—*J. Political Economy*, June, 1917, XXV, No. 6, 521-541.

This interesting article endeavors to trace the effect of the more recent wars on marriage and especially on birth rate of the people engaged in these struggles. His conclusions are that, "war temporarily checks marriage and reproduction, war kills off its thousands or millions of men, but experience shows that in the past, with the possible exception of the extremely destructive Thirty Years' War, these ravages in the population have been quickly made good."

That the present war is causing enormous losses, and that there are large decreases among the European nations engaged in the war in marriage and births, cannot be doubted, though no precise data on these problems are yet available. The figures given in the article are well worth perusal. As to what conditions in these respects will follow after the present great conflict it is hard to foretell. Many important questions present themselves. The author ends by expressing the hope that for the sake of future peace, if for no other, the rate of multiplication shall meet with intelligent restriction.

CURRENT NOTES

The two 1918 William Ellery Hale lectures before the National Academy were given on April 22 and 24 by John C. Merriam, Professor of Paleontology, University of California, the subject being: "*The Beginnings of Human History from the Geologic Record.*"

On May 18 Professor Merriam delivered, before the Biological Society of Washington, a lecture on "*Cave Hunting in California,*" in which he described the vain quest so far for traces of man's geological antiquity.

On May 9, 1918, Dr. Raymond Pearl gave the sixth lecture of the series on Science in Relation to the War before the Washington Academy of Sciences, the subject of the lecture being: "*Biology and War.*"

Dr. Raymond Pearl has recently resigned his position as Biologist of the Maine Agricultural Experiment Station, Orono, Maine, and has been appointed Professor of Biometry and Vital Statistics in the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Maryland. For the present Dr. Pearl continues his work as Statistician of the United States Food Administration.

Professor A. F. Shull delivered the annual address before the Sigma Xi, of the University of Michigan, on May 28, on the subject "*Heredity and the Fate of the Warring Nations.*"

On June 6 Dr. A. Hrdlička lectured on the subject of Man's Evolution, Past, Present and Future, at the Battle Creek Sanitarium, Battle Creek, Michigan.

Dr. André Hovelacque, son of Abel Hovelacque, and himself an anthropologist, has been rewarded by the French Government for distinguished medical services in the field, by being made Chevalier of the Legion of Honor.

The annual meeting of the American Association for the Advancement of Science for 1918, and hence that of Section H has been changed, in view of war conditions and of the large number of scientific men now working at Washington, from Boston to Baltimore. It would seem eminently proper to devote the anthropological meetings, as far as may be feasible, to anthropological problems connected with the war.

A "Galton Society" has recently been formed in New York City, with a membership limited to 25. Dr. Chas. B. Davenport is president, Prof. J. H. McGregor secretary.

According to latest advices from Dr. Simoens da Silva, the organization of the XX Congress of Americanists, which according to present arrangements is to be held at Rio de Janeiro, June 18-20, 1919, is proceeding favorably. Dr. Silva is traveling personally, in the interest of the Congress over the most important States of the Republic.

The McIntire Prize.—"In 1915 Dr. Charles McIntire resigned the secretaryship of the American Academy of Medicine. In appreciative Commemoration of his twenty-five years of faithful service, the American Academy of Medicine raised a fund, the income of which will be expended in accordance with Dr. McIntire's suggestions. The Academy now announces two prizes, to be awarded at the annual meetings for 1918 and 1921, respectively.

"The subject for 1921 is 'What Effect Has Child Labor on the Growth of the Body.' The members of the Committee to award this prize are: Dr. Thomas S. Arbuthnot, Dean of the Medical School of the University of Pittsburgh; Dr. Winfield Scott Hall, Professor of Physiology, Northwestern University; and Dr. James C. Wilson, Emeritus Professor, Practice of Medicine and of Clinical Medicine, Jefferson Medical College, Philadelphia.

"The conditions are:

"(1) The essays are to be typewritten and in English, and the contests are to be open to everyone.

"(2) Essays must contain not less than 5,000 or more than 20,000 words, exclusive of tables. They must be original and not previously published.

"(3) Essays must not be signed with the true name of the writer, but are to be identified by a nom de plume or distinctive device. All essays are to reach the Secretary of the Academy on or before January 1 of the years for which the prizes are offered and are to be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and to contain his true name inside.

"(4) Each competitor must furnish four copies of his competitive essay.

"(5) The envelope containing the name of the author of the winning essay will be opened by Dr. McIntire, or in his absence by the presiding officer at the annual meeting, and the name of the successful contestant announced by him.

"(7) In case there are several essays of especial merit, after awarding the prize to the best, special mention of the others will be made and both the prize essay and those receiving special mention are to become at once the property of the Academy, probably to be published in the *Journal of Sociologic Medicine*. Essays not receiving a prize or special mention will be returned to the authors on application.

"(8) The American Academy of Medicine reserves the right to decline to give the prize if none of the essays are of sufficient value.

"The present officers of the American Academy of Medicine are: George A. Hare, M.D., Fresno, Cal., President; J. E. Tuckerman, M.D., Cleveland, President-Elect; Charles McIntire, M.D., Easton, Pa., Treasurer; and Thomas Wray Grayson, M.D., 1101 Westinghouse Building, Pittsburgh, Pa., Secretary (now with the U. S. Army)."

UNIVERSAL MILITARY TRAINING. *Washington Medical Annals*, 1917, 339-340.

"The following resolutions were adopted unanimously at a meeting of Committees from all States (except Maine and Delaware), held in the Congress Hotel, Chicago, October 23, 1917:

"WHEREAS, The experience through which the United States is now passing should convince every thoughtful person of the necessity for the universal training of young men, not only for the national defense in case of need, but also to develop the nation's greatest asset—its young manhood—in physical strength, in mental alertness, and in respect for the obligations of citizenship essential to democracy; Therefore, be it

"RESOLVED by the State Committees of the Medical Section of the Council of National Defense that they strongly urge the adoption by our Government at this time of a comprehensive plan of intensive universal military training of young men for a period of at least six months, upon arriving at the age of nineteen years; and that this body also support the movement to secure the introduction into public schools of adequate physical training and instruction;

"RESOLVED, That the members of each State Committee immediately take active steps to insure public support for the subject of these resolutions through the newspapers, through public meetings and through the appointment of committees in each county; also that copies of these resolutions be forwarded to the Senators and Members of Congress in their respective States, with a personal request that favorable action be taken at the coming session of Congress upon a measure following the principle of the Chamberlain Bill and to become operative as soon as the army cantonments are no longer required for the training of the forces in the present war:

"RESOLVED, That each State Committee from time to time report to the Medical Section of the Council of National Defense as to action taken and progress secured in their several States."

In addition to the above the following resolution was adopted without a dissenting vote by the Clinical Congress of Surgeons of North America at Chicago, October 25, 1917:

"WHEREAS, the experiences of the nation convince us of the necessity for universal military training, to furnish qualified men for defense, to strengthen manhood and mental poise, and to make for a more efficient citizenship; and

"WHEREAS, we believe it will democratize youth and furnish discipline, while developing physical force and endurance, and will produce better fathers and workers for the ranks of peace;

"THEREFORE, BE IT RESOLVED, that the Clinical Congress of Surgeons at its eighth annual session urges upon Congress at its coming session the passage of a measure along the general lines of the Chamberlain Bill for Universal Military Training, and that the cantonments now used by the national army be utilized, if possible, for such work."

The Paris School of Anthropology under Bombardment.—In a recent (May 2) letter to the Editor, Prof. L. Manouvrier, Subdirector of the Paris École d'Anthropologie, writes: "The bombardment of Paris has not affected the morale of the population. Notwithstanding its daily horrors and the continuity of the menace day and night the activities of the city have remained normal. During the last lesson of my course at the École, we came under the trajectory of the shells from the great cannon and heard during the hour the bursting of three shells. Those attending the lecture, as numerous as usual, did not show throughout all this the slightest emotion. . . . I am oppressed, however, by the apprehension that this barbarous, blind destruction may at any moment reach our collections, preserved with those of pathological anatomy in the old building of the school, besides so many other scientific and artistic treasures of Paris. And we have no effective means of protection. Our only hope and confidence lies in the valor of the French, English, Belgian and at present also the American soldier."

Dr. William C. Farabee, curator in the Museum of the University of Pennsylvania and one of the associate editors of this JOURNAL, has been appointed captain in the Intelligence Corps of the U. S. Army.

Dr. Joseph Deniker, chief librarian of the Museum d'Histoire naturelle, Paris, and a distinguished anthropologist, died on March 18, aged sixty-six years. Outside of France, Dr. Deniker, who was of Russian birth, was best known through his valuable work on *The Races of Man* of which there is an English edition.

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PHYSICAL ANTHROPOLOGY: ITS SCOPE AND AIMS; ITS HISTORY AND PRESENT STATUS IN AMERICA

ALEŠ HRDLIČKA

C. RECENT HISTORY AND PRESENT STATUS OF THE SCIENCE IN NORTH AMERICA

There is no natural line of demarkation that would separate the older from the more recent history of Physical Anthropology in this country, and it is even impossible to draw any artificial line. The division here adopted, into the history of the branch connected with workers who are no more with us and that connected with workers still living, is quite arbitrary and merely for the purpose of facilitating discussion.

The writer would fain have left the task of recording the recent history of progress in this branch to one of his colleagues and had entertained the hope that Professor MacCurdy might be induced to take up the work, but owing to death in the Professor's family and other untoward circumstances, this could not be done. When the writer finally assumed the task he found it embarrassed with many difficulties, and turned for needed support and assistance to his associates on the editorial board of this journal where he met with generous response. Professor MacCurdy in particular gave valuable assistance by placing at the writer's disposal his manuscript notes on "The Academic Teaching of Anthropology" in this country. If notwithstanding the help thus freely tendered the writer and his own prolonged research in the field, the account here presented should not be found free of imperfections, this will be due largely to the loss of precious personal information on certain points that could have been furnished by such men as Brinton, Putnam, McGee and Mason; to the many obstacles in the way of

securing, even with the help of the authors themselves, complete errorless bibliographies; and to the difficulty of adequately appraising the important personal influence of various workers, besides that of their literary productions.

The recent history of Physical Anthropology in this country may be said to begin with the coming into existence of the Army Medical Museum in Washington, and the Peabody Museum in Boston, both established, curiously enough, in the same year (1866). Research in the field received great stimulus from Bowditch's work on children in Boston in 1877; in the foundation of the Bureau of American Ethnology, and the organization of the Washington Anthropological Society, 1879; in the completion of the U. S. National Museum, 1881; in the formation of the section of Anthropology in the American Association for the Advancement of Science, 1882; in the foundation at Washington of the *American Anthropologist*, 1888; in the organization of the Department of Anthropology at Clark University, Worcester, Mass., 1889; in the work undertaken on the Indian tribes by the Department of Ethnology of the Columbian Exposition, Chicago, 1891; in the establishment of Departments of Anthropology at Columbia University, 1892, at the American Museum of Natural History, 1894, and at the Field Columbian Museum, 1892-4; in the institution of the Hyde expeditions to the southwestern and Mexican tribes, for the American Museum of Natural History, 1899; in the organization of the American Anthropological Association, 1902; in the establishment of the Division of Physical Anthropology in the United States National Museum, 1903; and in the foundation the same year, of the Museum and Professorship of Anthropology at the University of California. Additional agencies that contributed to the development of the branch in the United States, were the establishment of collections and courses of instruction in Anthropology at Yale University, at the University of Chicago, and at the University of Minnesota; together with the formation of important gatherings of anthropological material at the Wistar Institute, at the Museum of the University of Pennsylvania, and at other centers of scientific activity. To which varied agencies must be added similar though more limited activities in Canada and Mexico.

As may be appreciated from the outline just given the field which confronts us is rather complex and extensive and it is evident that at best full justice can not be done the subject within the brief scope of this article. Even the method of proper approach of the subject

presents unusual difficulties. Chronological treatment of the developments, which were mostly unconnected, except in rough lines, appears almost impracticable, and the only plan promising reasonable success is that of dealing separately and succinctly with institution after institution, organization after organization. This plan has been adopted and, to avoid possible partiality, it was decided to treat of the various institutions and organizations in geographical order, rather than on any other plan. Institutions which have no anthropological collections and which do not contribute directly to research in physical anthropology, even though more or less attention to the subject be given in their lecture courses, must for the present be omitted from consideration.

CAMBRIDGE, MASSACHUSETTS

The recent as the older history of Physical Anthropology at Cambridge is confined almost entirely to the Peabody Museum and Harvard University.

Associated at the *Peabody Museum* with Professor Putnam, and devoting some of their time to anthropological work, were, as has already been mentioned in Part B, at first Miss C. A. Studley (1882-6), and later (1877-1894) Mr. Lucien Carr.

The next disciple and associate of Professor Putnam who contributed to research in somatology, and who is still living, was George A. Dorsey. After collaborating with Professor Putnam during the World's Columbian Exposition, Chicago, he became in 1894 Assistant in Anthropology at the Peabody Museum, and shortly after that Instructor in Anthropology at Harvard University. In 1896, however, he left Harvard to accept the position of Assistant Curator in Anthropology at the Field Museum of Natural History, Chicago. The course he commenced at Harvard in 1894-5, was in general Anthropology, the first part only being devoted to Somatology.¹

In 1897 the place vacated by Dorsey was taken by Frank S. Russell, and thenceforward Physical Anthropology received additional attention; Russell's health however soon began to fail, obliging him to curtail his work, until in 1903 he succumbed to pulmonary tuberculosis. His writings are listed in Section B.

¹ See Dorsey, George A., History of the Study of Anthropology at Harvard University. *The Denison Quarterly*, iv, No. 2, 1896, 77-97.

For his bibliography see final section of this memoir.

Russell's place, after his death, was given to William C. Farabee, who took up almost exclusively the teaching of Physical Anthropology, together with the care of the collections and exhibits in that branch. He in turn resigned in 1912 to accept a position at the Museum of the University of Pennsylvania. His published contributions to Physical Anthropology are as follows:

Notes on negro albinism. *Science*, 1903, xvii, 75.

Inheritance of digital malformations in man. *Peabody Mus. Papers*, 1905, iii, No. 3, 69-77.

The Amazon Expedition of the University Museum. *Mus. J., Univ. Pa., Phila.* 1916, vii, No. 4, 210-244.

In 1913 Doctor Farabee was succeeded at the Peabody Museum by Dr. E. A. Hooton, the present incumbent of the position, who devotes his time exclusively to somatology.

The history of the development of instruction in Physical Anthropology at Harvard (Peabody Museum) is quite instructive. Teaching in the branch began in 1890, as a small part of the general course in Anthropology.² In 1895 the first part of the course was devoted to Somatology and instruction extended to laboratory work which included "the comparison and identification of the bones of man with those of other mammals; the description and measurement of the human skeleton; comparison of corresponding bones in different races; the study of the skin, hair, etc., and anthropometry or the measurements and relations of different parts of the human body." In 1897-8, under Russell, there was a half course of three hours a week devoted to Physical Anthropology, to which was added some laboratory work. In 1911-12, under Farabee, Physical Anthropology had a course extending throughout the session. Hooton, who in 1913 was appointed Assistant Curator and in 1914 Curator of Somatology at the Museum, gave in 1914-15 in addition to the regular course in Physical Anthropology also an advanced course in that branch, and instruction in Criminal Anthropology and Race Mixture. During 1914-16 the old lecture room at the Peabody Museum was converted into the Student Laboratory of Physical Anthropology, while additional facilities were provided for lectures and for research work by advanced students on material in the Museum, at the same time the exhibition and storage space for Physical Anthropology being greatly enlarged. Between 1915 and 1917 new exhibits in Physical Anthro-

² For most of this information the writer is indebted to Doctor Hooton.

pology were installed and the laboratory facilities increased. At present the course in Physical Anthropology at Harvard comprises one two-hour lecture and four hours laboratory work per week throughout the college year, in addition to reading. A piece of original investigation is given the student in the second half of the course. The average number of students is not large (about 9), but more attend the course on Criminal Anthropology and Race Mixture; besides which lectures on Somatology are given during the first month of the general course, which are attended by 75 to 100 students.

In 1917 the *Harvard Medical School* recognized the usefulness of Physical Anthropology by appointing Doctor Hooton Fellow in Anatomy and having him give lectures on Physical Anthropology to the first year anatomy class, to the fourth year course in Orthodontia, and to the Graduate School of Medicine.

Doctor Hooton's published contributions to Physical Anthropology since his advent at Harvard are as follows:

- Saxon graveyard at East Shefford, Berks, by Harold Peake and E. A. Hooton. *J. Anthropol. Inst.*, 1915, *xlv*, 92-103. (Osteological part by E. A. H.)
- Notes on skeletal remains from Martha's Vineyard. *Am. Anthropol.*, 1916, *N. S.* *xviii*, 98-104.
- Some anthropological comments upon the so-called "herbivorous" and "carnivorous" types of man. *Boston Med. & Surg. J.*, 1916, *CLXXIV*, No. 4, 127-131.
- The evolution of the human face and its relation to head form. *Dental Cosmos*, 1916, *LVIII*, No. 3, 272-282.
- The relation of physical anthropology to medical science. *Med. Rev. of Revs.*, 1916, *xxii* No. 4, 260-264.
- Preliminary remarks on the archaeology and physical anthropology of Tenerife. *Am. Anthropol.*, 1916, *n. s.*, *xviii*, 358-365.
- Oral surgery in Egypt during the Old Empire. *Harvard African Studies*, Cambridge, 1917, *i*, 29-32.
- On certain Eskimoid characters in Icelandic skulls. *Am. J. Phy. Anthropol.*, Wash., 1918, *i*, 53-76.

Outside of the Peabody Museum the recent history of Anthropology in Boston is confined with one exception to the activities of individuals.

The exception is the *Warren Anatomical Museum* of the Harvard Medical School. This Museum, now housed in a palatial edifice, contains very important osteological collections which include valuable anthropological material. These collections will be described on another occasion. While the Museum as such has given no direct attention to Anthropology, many of its specimens have been described or

studied by Professor Thomas Dwight. In addition numerous specimens of Peruvian trephining now in the Museum have been described by Dr. Julio C. Tello by whom they were collected (Prehistoric Trephining among the Yauyos of Peru. Proc. 18th Intern. Congress Americanists, London, 1913, 75-83). The Curator of the Museum, Dr. William F. Whitney, has also published some interesting studies on the skeletal remains in the Peabody Museum (Notes on the Anomalies, Injuries and Diseases of the Bones of the Native Race of North America. Peabody Museum Reports, III, 433-448, 1886).

The work of Prof. Thomas Dwight, recently deceased (1843-1911),³ is so modern that it belongs properly to this section, and so substantial that it deserves more than a passing notice.

Professor Dwight was particularly interested in skeletal anomalies and skeletal variation, and for many years was an assiduous worker in these directions. The results are embodied in a series of valuable articles, published partly in American, partly in European journals. He was also actively interested in the development of the Warren Anatomical Museum and added many a valuable specimen to its collections.

His services to Physical Anthropology can be clearly seen from his bibliography relating to this branch. He contributed particularly to our knowledge of the anomalies of the carpal and tarsal bones, and to the variations of the sternum, the scapula, the articular surfaces of the long bones, and the spine. An event of great interest was his discovery in 1904 of a complete bony supracondyloid bridge on a human arm bone. This, so far as known a unique specimen of its nature, is preserved in the Warren Museum.

Curiously, Professor Dwight like so many eminent men brought up in his time, had certain reservations on the subjects of man's antiquity and evolution. His publications of interest to Physical Anthropology follow:

A contribution to the anatomy of the jugular foramen. *Am. J. Med. Sciences*, 66, 1873.

Remarks on the brain, illustrated by the description of the brain of a distinguished man (Chauncy Wright). *Proc. Am. Acad. Arts and Sciences*, 1877, XIII, 210-215.

The identification of the human skeleton; *Commun. Mass. Med. Soc.*, 1878, XII, 165-218.

³ Obituary notices in *Bost. M. & S. J.*, 1911, 465-467; *J. Am. M. Ass.*, 1911, 1067; and in *Anat. Rec.*, 1911, v, 531-539 (with a bibliography—not quite complete).

- The sternum as an index of sex and age. *J. Anat. & Phys.*, 1881, xv, 327-330.
- The significance of bone structure. *Mem. Bost. Soc. Nat. Hist.*, 1886, iv, 1-15.
- Account of two spines with cervical ribs, one of which has a vertebra suppressed, and absence of the anterior arch of the atlas. *J. Anat. & Phys.*, 1887, xxi, 539-550.
- The range of variation of the human shoulderblade. *Am. Naturalist*, July, 1887, 627-638.
- The significance of the third trochanter and of similar bony processes in man. *J. Anat. & Phys.*, 1890, xxiv, 61-68.
- The closure of the cranial sutures as a sign of age. *Bost. Med. & Surg. Journ.*, 1890, cxxii.
- The sternum as an index of sex and age. *J. Anat. & Phys.*, 1890, xxiv, 527-535.
- Irregular union of the first and second pieces of the sternum in man and apes. *J. Anat. & Phys.*, 1890, xxiv, 536-542.
- Fossa prænalis. *Am. J. Med. Sciences*, Feb., 1892.
- Observations on the *psoas parvus* and *pyramidalis*: a study of variation. *Proc. Am. Philos. Soc.*, 1893, xxxi, 117-123.
- The range and significance of variation in the human skeleton. The Shattuck Lecture. *Pub. of the Mass. Med. Soc.*, 1894, 8°, 29 pp.
- Statistics of variations, with remarks on the use of this method in Anthropology. *Anat. Anz.*, 1894, x, 209-215.
- Methods of estimating the height from parts of the skeleton. *Med. Record*, 1904, XLVI, 293-296.
- The significance of anomalies. *Am. Naturalist*, 1895, xxix, 130-135.
- Notes on the dissection and brain of the chimpanzee "Gumbo." *Mem. Bost. Soc. Nat. Hist.*, 1895, v, 31-52.
- Remarkable skulls. *J. Bost. Soc. Med. Sci.*, 1899, iv, 52-54.
- Description of the human spines showing numerical variation, in the Warren Museum of the Harvard Medical School. *Mem. Bost. Soc. Nat. Hist.*, 1901, v, 237-312.
- Os intercuneiforme tarsi, Os paracuneiforme tarsi, Calcaneus secundarius. *Anat. Anz.*, 1902, xx, 465-472.
- The intercuneiform bone of the foot. A new bone. *J. Med. Research*, 1902, vii.
- A separate subcapitulum in both hands, *Anat. Anz.*, 1904, xxiv, 253-255.
- The diagnosis of anatomical anomalies causing malposition of the head, and distortion of the face. *J. Med. Research*, 1904, xii, 17-39.
- A bony supracondyloid process in man. With remarks about supracondyloid and other processes from the lower end of the humerus. *Am. J. Anat.*, 1904, iii, 221-228.
- The size of the articular surfaces of the long bones as characteristic of sex: an anthropological study. *Am. J. Anat.*, 1904-5, iv, 19-31.
- Mutations. *Science*, 1905, n. s. xxi, 529-532.
- Numerical variation in the human spine. *Anat. Anz.*, 1906, xxviii, 33-40, 96-102.
- Variations of the bones of the hands and feet. A clinical atlas. 8°, Phila. and London, 1907. 25 pp, 36 pl.
- Concomitant assimilation of the atlas and occiput with the manifestation of an occipital vertebra. *Anat. Record*, 1909, iii, 321-333.

A criticism of Pfitzner's theory of the carpus and tarsus. *Anat. Anz.*, 1909, xxxv, 366-70.

Description of a free Cuboides secundarium, with remarks on that element, and on the Calcaneus secundarius. *Anat. Anz.*, 1910, xxxvii, 218-224.

Free Cuboides secundarium on both feet, with some further remarks on Pfitzner's theory. *Anat. Anz.*, 1911, xxxix, 410-414.

The individual workers in Boston who during the last few decades have contributed materially to Physical Anthropology and who are still with us, are Prof. William Z. Ripley, sociologist, anthropologist and economist, and Dr. Dudley Allen Sargent, director of physical training at the Harvard University.

Wm. Z. Ripley, since 1901 professor of political economy at Harvard, lectured from 1893 to 1901 in sociology and anthropology in Columbia University, but occupied also during the larger part of this period the chair of assistant professor of sociology, and eventually that of professor of economics, at the Massachusetts Institute of Technology. In the fall of 1896 he delivered before the Lowell Institute of Boston a series of lectures on "Physical Geography and Anthropology," an outgrowth of which was, in 1899, the publication of his well known volume on "The Races of Europe,"⁴ supplemented by a bibliography of the anthropology and ethnology of Europe.⁵ Other contributions of Professor Ripley to the subject of Physical Anthropology are as follows:

Une carte de l'indice céphalique en Europe. *L'Anthrop.*, 1896, vii, 513-525.

Acclimatization. Bibliography. *Appleton's Popular Science Monthly*, N. Y., 1896, xlviii, 662-675, 779-793.

Ethnic influences in vital statistics. *Pub. Amer. Stat. Ass.*, Boston, 1896, v, 18-40.

The form of the head as influenced by growth. *Science*, 1896, n. s., iii, 888-889.

The racial geography of Europe. *Appleton's Popular Science Monthly*, N. Y., 1897-9.

Deniker's classification of the races of Europe. *J. Anthropol. Inst.*, 1898, n. s., i, 166-173, map.

The European population of the United States. The Huxley Memorial Lecture for 1908. *J. Royal Anthropol. Inst. Gr. Brit. & Ire.*, 1908, xxxviii, 221-240.

Races in the United States. *Atlantic Monthly*, 1908, 745-759.

Physical education in colleges. *North Am. Rev.*, Feb. 1883, cxxxvi, 166.

The work of Dr. Dudley A. Sargent, at the Harvard University, has been directed entirely toward the physical development and training of the students. It has given rise to an extensive introduction of his

⁴ 8°, N. Y., D. Appleton & Co.

⁵ Published by the Public Library of the City of Boston.

system in American colleges and has resulted in much improvement in the physical condition of the students. Regrettably, however, the attention given to the practical side of the work has been so preponderant that its scientific possibilities received but little attention. New measurements were adopted and new instruments developed; the observations are generally carried on by men and women who, even if medical graduates, have little knowledge of anthropology; and the results are that a large proportion of the observations obtained remains outside the realm of anthropology, have no claim to scientific accuracy and are indeed lost to our science. Doctor Sargent himself, however, has published a number of papers which are of distinct value to physical anthropology. The following is a list of these:

- The physical proportions of the typical man. *Scribner's Mag.*, July, 1887, 3-17.
- The physical characteristics of the athlete. *Scribner's Mag.*, Nov., 1887, 541-561.
- Anthropometric apparatus, with directions for measuring and testing the principal physical characteristics of the human body. 4°, Cambridge, Mass., 1887.
- The physical development of women. *Scribner's Mag.*, Feb. 1889, 172-185.
- Anthropometric charts for different ages, male and female, ranging from 10 to 26 years of age. Cambridge, Mass., 1893.
- Physical state of the American people. In "The United States of America," 1894, II, 452-475.
- Physical exercise and longevity. *North Am. Rev.*, May, 1897.

WORCESTER, MASSACHUSETTS

One of the earliest modern foci of physical anthropology in this country developed at *Clark University*. This University was in fact the first to recognize Anthropology (general) as "a fit and proper subject for post-graduate researches and investigations leading to the degree of Ph.D., and the first university to confer such a degree."⁶

In 1888 Dr. G. Stanley Hall, who though primarily a psychologist has always been keenly interested in anthropological problems, became Professor of Psychology as well as President of the University, and under his influence a year later we find established at the University, as a part of the Department of Psychology, a sub-Department of Anthropology, with Dr. Franz Boas as Docent.

For about six years prior to this, Doctor Boas had been active in the ethnology and anthropology of the Eskimo and of the Indian tribes of

⁶ Chamberlain (A. F.), *Anthropology* (at the C. U.). Clark Univ., 1889-1899, Decennial Celebration volume, 8°, Worcester, Mass., 1899, 148-160.

northwestern Canada. While at Clark University he continued partly in the same direction, but began also, under the influence doubtless of the work of Henry P. Bowditch, to pay close attention to the problems connected with growth of children. With the assistance of G. M. West, A. F. Chamberlain, T. L. Bolton and J. F. Reigard, over 3,000 children of Worcester were measured. Some of the results of this work were in 1892 discussed by Doctor Boas in *Science* (see bibliography, p. 292), while the main results were published the same year by Dr. West. West's report appeared under the title "Anthropometrische Untersuchungen über die Schulkinder in Worcester, Mass., Amerika," in the *Archiv für Anthropologie*, 1893, xxii, 13-48.

In November, 1890, Doctor West was appointed Fellow in Anthropology at the University, and devoted himself to consideration of the physical side of the science, taking, as already mentioned, a prominent part in anthropometric investigations on the children of the Worcester schools. During the summer of 1891 he was engaged in anthropological measurements of the Indian tribes of Quebec and the maritime provinces of Canada. Appointed Assistant in Anthropology in 1891, he continued in that position until the close of the academic year 1891-2, when he became associated with Doctor Boas in the sub-Department of Anthropology of the World's Columbian Exposition, having charge of the anthropological investigations during Doctor Boas' absence in Europe. After the Exposition he was for a short time connected, as somatologist, with the Department of Anthropology of the Field Columbian Museum.

Doctor West in addition to the already mentioned report on the examination of the children at Worcester, has published the following contributions to physical anthropology:

The status of the negro in Virginia during the colonial period. Thesis for Doctorate., N. Y., 1890, 76 pp.

The growth of the breadth of the face. *Science*, 1891, xviii, 10-11.

Eye-tests on school children. *Am. J. Psychol.*, 1892, iv, 595-596.

The growth of the body, head, and face. *Science*, 1893, xxi, 2-4.

The anthropometry of American school children. *Mem. Internat. Cong. Anthropol.*, 1893 (Chicago, 1894), 50-58.

The growth of the human body. *Educ. Rev.*, 1896, xii, 284-289.

In 1891-2, after Doctor Boas was called from Clark University to the Department of Anthropology of the World's Columbian Exposition, at Chicago, Mr. A. F. Chamberlain, then a fellow in anthropology at the University, became Lecturer there on that subject. In 1911, he was made a full professor of anthropology at the Clark University.

Professor Chamberlain (†1914) was essentially an ethnologist, linguist and bibliographer. His services to physical anthropology consisted mainly of numerous annotated references to publications in this branch of science which he published during many years in the *American Anthropologist*. As an associate of Boas, however, he took part in the measurement of the children at Worcester, and later superintended measurements of the school children at Toronto. In 1891 he also carried on, under the auspices of the British Association for the Advancement of Science, anthropological investigations among the Kootenay of Canada, which included measurements and somatological observations of the people. His courses at the University as well as his special lectures dealt in part with the more general aspects of physical anthropology. His published contributions relating more or less directly to this branch are:

Observations on the relation of physical development to intellectual ability, made on the school children of Toronto, Canada. *Science*, 1896, n. s. iv, 156-159.

African and American; the contact of the negro and the Indian. *Science*, 1891, xvii, 85-90.

Physical Characteristics [of the Kootenay Indians]. Eighth Report on the North-Western tribes of Canada, *Proc. B. A. A. S.*, London, 1892, 38-45.

Human physiognomy and physical characteristics in folk-lore and folk-speech. *J. Am. Folk-Lore*, 1893, vi, 13-24.

Anthropology in universities and colleges. *Pedagogical Seminary*, Oct., 1894, iii, 48-60.

Primitive Anthropometry and its Folk-lore. *Proc. A. A. A. S.*, 1894, xliii, 348-349.

Darwin and Lincoln. An anniversary address. *Evening Gazette*, Feb. 8, 1898, Worcester, Mass.

The "child type." *Pedagogical Seminary*, 1899, v, 471-474.

Report and history of the Department of Anthropology, Clark University, 1889-1899. Decennial Celebration Volume, Clark University, 1889-1899, 148-160.

Some recent anthropometric studies. *Pedagogical Seminary*, 1901, xliii, 239-257.

The American Indian elements in the Philippines. *Am. Antiquarian*, 1902, xxxiv, 97-100; also *Handbook American Indian*, B. A. E., 1910, ii, 51-53.

The child: a study in the evolution of man. 8°, London, 1903.

Iroquois in northwestern Canada. *Am. Anthropol.*, 1904, vi, 459-463.

Anthropological activities of Clark University, 1902-1906. *Am. Anthropol.*, 1906, viii, 491-493.

Since the death of Professor Chamberlain no appointment to the chair of Anthropology has been made at Clark University, though some lectures on the subject have been given by Dr. A. N. Gilbertson and others. Beginning with 1910, there is published under the able edi-

torship of Prof. G. Stanley Hall *The Journal of Race Development*, which includes articles of direct value to physical anthropology. Of interest to our branch is also Professor Hall's *Adolescence*, 1904, 2 vols. (See *Am. Anthropol.*, VI, 539.)

THE PHILLIPS ACADEMY, ANDOVER, MASSACHUSETTS

In 1901 a Department of Archaeology was founded in this Academy by Mr. and Mrs. Robert Singleton Peabody, and in connection with this Department Dr. Charles Peabody, Mr. W. K. Moorehead, and Dr. Alfred V. Kidder have conducted explorations in Maine, New Brunswick, Missouri, Arkansas, and in the Pueblo region, during which careful attention was given to the collection of skeletal material. The excavations of the cemeteries at Pecos, N. M., by Doctor Kidder have been particularly fruitful in this respect; though not yet completed they have already yielded parts of upwards of 650 skeletons, material which is well dated and will eventually constitute a standard series of much value. Since 1917 there is also attached to the Department Dr. Carl E. Guthe, who has recently completed an interesting study on the Boston Russian Jews:

Notes on the cranial index of Russian Jews in Boston. *Am. J. Phy. Anthropol.*, Wash., 1918, I, No. 2.

SMITH COLLEGE, NORTHAMPTON, MASSACHUSETTS

Dating from 1892 the chair of the Department of Zoölogy of this College has been held by Dr. H. H. Wilder, who besides his other studies has given considerable attention to Physical Anthropology. He has been particularly interested in the study of the epidermic ridge patterns of the human palms and soles, and in their value as racial criteria, as important data for the study of heredity, and as a practical means of personal identification. Some of these investigations have been carried on in conjunction with his wife, Mrs. Inez Whipple Wilder. Mention may be made, too, of his work on the plastic restoration of faces on skulls, including both recent and prehistoric types, and the excavation of skeletons of Western Massachusetts Indians with the study of their modes of interment. Beginning in 1905 Professor Wilder has offered a course in general anthropology and since 1912-13 also a brief general graduate course in physical anthropology.

The list of Professor Wilder's publications touching on Physical Anthropology is as follows:

- On the disposition of the epidermic folds upon the palms and soles of primates. *Anat. Anzeiger*, 1897, XIII, 250-256.
- Palms and soles. *Am. J. Anat.*, 1902, I, No. 4, 423-441.
- Scientific palmistry (not exactly what its name denotes). *Pop. Sci. Monthly*, Nov. 1902, 41-54.
- Palm and sole impressions, and their use for purposes of personal identification. *Pop. Sci. Monthly*, Sept. 1903, 385-410.
- The restoration of dried tissues with especial reference to human remains. *Am. Anthropol.*, 1904, VI, 1-17.
- Racial differences in palm and sole configuration. I. *Am. Anthropol.*, 1904, VI, 244-293 (Maya, Chinese, American Negroes); II. *Am. Anthropol.*, 1913, XV, 189-207 (Liberian Negroes).
- Duplicate twins and double monsters. *Am. J. Anat.*, 1904, III, No. 4, 387-472.
- Zur körperlichen Identität bei Zwillingen. *Anat. Anz.*, 1908, XXXII, 193-200.
- Palm and sole studies. *Biol. Bull.*, Feb.-Mar. 1916, XXX, No. 2, 135-172, and No. 3, 211-252.
- The position of the body in aboriginal interments in Western Massachusetts. *Am. Anthropol.*, 1917, XIX, 372-387. (In conjunction with R. W. Whipple.)
- Restoration of a cliff-dweller. *Am. Anthropol.*, 1917, XIX, 388-391.

A former student of Professor Wilder, Miss Inez Whipple (now Mrs. Harris H. Wilder), published "The ventral surface of the mammalian chirodium, with especial reference to the condition found in man," in Schwalbe's *Zeits. f. Morph. u. Anthropol.*, 1904, VII, 261-368. The conditions observed in the lower mammals and especially the primates, furnish a key to the more complex conditions found in man, and the whole work is of importance for the study of the human palms and soles.

Another student of Professor Wilder, Miss Marian Vera Knight, has recently published a memoir on "The craniometry of southern New England Indians," 4°, Yale University Press, New Haven, Conn., 1915, 35 pp.

YALE UNIVERSITY, NEW HAVEN, CONNECTICUT

The development of Physical Anthropology at Yale University is essentially connected with Doctor MacCurdy, Instructor in Anthropology at the University 1898-1900, Lecturer in Anthropology and Curator of the anthropological collections 1902-10, Assistant Professor of Prehistoric Archeology and Curator of the Anthropological Collections 1910—. Lectures touching on Physical Anthropology were also given at the University, until his death, by Wm. G. Sumner, Professor

of Political and Social Science, but they extended to little more than general information on the subject.⁷

At present, instruction in Anthropology is grouped with that in Social Sciences. The courses of special interest to our branch in the Graduate School for the year 1917-18, were that of Prof. H. B. Ferris, on "The Natural History of Man" (two hours weekly); and that of Asst. Prof. George Grant MacCurdy, on "Physical Anthropology" (three hours weekly, first term).

Doctor MacCurdy, a student of Manouvrier, has shown special interest in the subject of man's antiquity. He served for many years as Secretary of the American Anthropological Association; fitted out a laboratory of physical anthropology at the Peabody Museum of Yale University, and has taken care of the collections of the Museum, which include some valuable series of racial crania and skeletons. His publications relating to physical anthropology are as follows:

Le poids et la capacité du crâne, etc. (avec N. Mohylianski). Bull. Soc. d'Anthrop. Paris, 1897, VIII, 408-420.

Twenty years of Section H. Science, 1902, n. s. xv, 532.

Some recent Paleolithic discoveries Am. Anthrop., 1908, x, 634-643.

Eolithic and Paleolithic man. Am. Anthrop., 1909, XI, 92-100.

Recent discoveries bearing on the antiquity of man in Europe. Smith. Rep. for 1909, Wash., 1911, 531-583.

Somatology and man's antiquity. Records of the Past, 1911, x, 322-331; copies in Scientific American Supplement, Feb. 10, 1912.

Pleistocene man from Ipswich (England). Science, 1912, n.s. xxxv, 505-507.

Ancestor hunting: The significance of the Piltdown skull. Am. Anthrop., 1913, xv, 248-256.

The man of Piltdown. Am. Anthrop., 1914, xvi, 331-336.

Interglacial man from Ehringsdorf near Weimar. Science, 1914, n.s. XL, 766-768.

Human skulls from Gazelle Peninsula. Anthrop. Publs. Univ. Pa. Museum, Phila., 1914, VI, No. 1, 1-21 (10 plates).

Neandertal man in Spain; the lower jaw of Bañolas. Science, 1915, n. s. XLII, 84-85; also Am. Anthrop., 1915, xvii, 759-762.

The revision of *Eoanthropus dawsoni*. Science, Feb. 18, 1916, n. s. XLIII, 228-231.

At present plans are being prepared for a new and more ample building for the Peabody Museum, and it can be confidently expected that

⁷ Consult in this connection Geo. G. MacCurdy: Extent of instruction in anthropology in Europe and the United States. Rep. Science, Dec. 22, 1899, n. s., x, 910-917; Teaching of Anthropology in the United States. Ibid., Feb. 7, 1902, xv, 211-216; Progress in Anthropology at Peabody Museum, Yale University. Am. Anthrop., 1903, n. s., v, 65.

with better laboratory and storage facilities the steady development of physical anthropology at Yale University will be assured.⁸

Professor Ferris published recently a memoir on "The Indians of Cuzco and the Apurimac," *Mem. Am. Anthropol. Ass.*, 1916, III, No. 2, 57-148.

An event of considerable importance to physical anthropology in connection with Yale University, was the Peruvian Expedition of 1912-15, conducted under the joint auspices of the University and the National Geographic Association, by Hiram Bingham, Professor of Latin-American History at Yale. This expedition resulted in the gathering of many portraits and measurements of the natives, with considerable skeletal material, and gave rise to a number of publications of direct interest to physical anthropology. These are:

Bingham (Hiram)—The discovery of prehistoric human remains near Cuzco, Peru; Bowman (Isaiah)—The Geologic relations of the Cuzco remains; Eaton (Geo. F.)—Report on the remains of man and of lower animals from the vicinity of Cuzco, Peru; *Am. J. Sci.*, 1912, XXXIII, 297-333.

Bingham (Hiram)—The investigation of the prehistoric human remains found near Cuzco, Peru, in 1911; Eaton (Geo. F.)—Vertebrate remains in the Cuzco gravels; Gregory (Herbert E.)—The gravels at Cuzco, Peru; *Am. J. Sci.*, 1913, XXXVI, 1-29.

Eaton (Geo. F.)—The collection of osteological material from Machu Picchu. *Mem. Conn. Acad. Arts & Sci.*, 1916, V, 96 pp.

The main collection of human skeletal material of the Bingham Expeditions is now under examination by Professor MacCurdy.

In this connection mention may also be made of the work of Dr. Jay W. Seaver, who, while serving as Lecturer on Physiology and Anthropometry in the New Haven Normal School of Gymnastics, published, in 1909, a creditable work on *Anthropometry and Physical Examination* (8°, New Haven, Conn., 191 pp., with bibliography). The book, which appeared in several editions, "was to place in the hands of directors of gymnasia, who were expected to examine people and prescribe exercise for them, a manual that should be a constant guide in securing measurements, and an efficient help in pointing out the vital matters that should be considered in making a physical diagnosis, or an estimate of the organic condition of the various parts of the body and their habits of action." The instruments and methods advocated were largely such as are used by Sargent of Harvard.

⁸ For a note on a bequest which will favor a sustained development of the branch at Yale, see p. 130, No. I, of this Journal.

NEW YORK

With two exceptions, interest in physical anthropology in New York State centers in New York City. The exceptions are *Buffalo* and *Cold Spring Harbor*.

In Buffalo, two craniological collections have been accumulated which deserve mention. One is that in possession of Dr. A. L. Benedict, while the other and more important is preserved in the Museum of the Buffalo Society of Natural Sciences. Both collections consist essentially of Iroquois material.

Spring Harbor will be referred to in another part of this section.

New York City

In New York City as elsewhere the earliest manifestations of interest in Physical Anthropology appear among anatomists and physicians; but until the latter part of the last century they amount to little more than attempts at the formation of two or three cranial collections. An exception to this is however to be noted in the work of Dr. Edward C. Spitzka, a prominent neurologist who made comparative studies of the brain, and paid attention to various medico-legal problems of anthropological interest. Dr. Spitzka's publications that deserve to be mentioned in this place are the following:

Contributions to encephalic anatomy. J. Nerv. & Ment. Dis., Chic., 1877, iv; repr. 11 pp.

The comparative anatomy of the pyramidal tract. J. Comp. Med. & Surg., N. Y., 1886, vii; repr. 46 pp.

The legal disabilities of natural children justified biologically and historically. A series of articles in the *Alienist & Neurologist*, 1899-1901.

Regicides, sane and insane. N. Y. Med. J., 1903, LXXVIII; repr. 74 pp.; Political assassins: are they all insane? J. Ment. Path., N. Y., 1902, III, repr. 32 pp.; Regenticides not abnormal as a class; a protest against the chimera of degeneracy. Phila. Med. J., 1902, ix; repr. 24 pp.

The State Pathological Institute

The State Pathological Institute of New York, designed as an institution of research, was established in New York City in 1895, under the direction of Dr. Ira Van Gieson. Its objects were, broadly speaking, the investigation from all points of view and with the most modern methods and instruments, of the abnormal classes of the population of New York State, and particularly the insane. The staff con-

sisted besides the Director of a number of Associates, each of whom had charge of a definite field of investigation. The writer had the honor to be the Associate in Anthropology. His anthropological researches began among the insane at the Middletown Hom. State Hospital for the Insane in 1894. In 1895 he was offered the position of associateship in the Institute, and the larger part of 1896 was spent in Europe in preparation for the new position, including studies in anthropometry under Manouvrier, medico-legal and related courses at the Paris University, and visits to the principal European insane asylums, penal institutions and Museums. On his return he assumed the duties at the Pathological Institute, established a laboratory and prepared a plan of investigations, the ambitious object of which was to determine the "normal standard of the American people, or, at least, such a standard, if this be possible, of the native population of the State of New York; and at the same time to examine all the abnormal classes of the population;" to find what anatomical, physiological and psychological abnormal characters are peculiar to each of these classes, or, if that be impossible, to show which abnormalities predominate in each class; to determine how each of these classes differs from the normal and the one from the other; to find explanations, and determine as far as possible the causation, of the observed variations; and eventually to compare the results with similar ones obtained on the same classes among other peoples.⁹

Due to the extent of the work, it was planned to secure in each institution for the insane, etc., one or two collaborators who after proper instruction would proceed with the work in that particular institution. The examinations were subdivided into parts such as could easily be carried out at one time without tiring the subjects or the observer. A visit was made to the principal institutions for the abnormal classes all over the state, and within a year over twenty collaborators were secured from the medical staffs of these institutions who proceeded with the investigations.

In the course of two and a half years, records were secured on over 11,000 individuals, including all classes of the insane, the epileptic, the idiot and to some extent also the criminal. But by this time there also

⁹ Hrdlička, A., Pathological Institute of the New York State Hospitals, Department of Anthropology. Outline of its Scope and Exposition of the Preliminary Work. *Bull. State Hospitals*, 11, No. 1, 1-18, Utica, N. Y., Jan. 1897. Also in *Contributions of Pathological Inst. N. Y. State Hospitals*, Utica, N. Y., 1898, No. 4.

developed two serious conditions. One was the slacking of the work at some of the asylums, due to changes in staff and in some cases to diminished personal interest in the research. The other and even more serious difficulty was the growing appreciation of the absence of normal standards, with which the results obtained on the abnormal classes could be contrasted. This necessitated the extension of studies on the one hand to the "normal" classes, which however were soon found to be far from such; while on the other hand there loomed up the absolute necessity of extensive preliminary studies on skeletal material of both "normal" and abnormal classes, which would help to throw light on many of the conditions encountered. The search for this skeletal material led the writer to years of most profitable association with Prof. George S. Huntington, head of the Department of Anatomy of the College of Physicians and Surgeons; while the need of deeper insight into normal humanity led to his search for such among the American Indians.

Investigations in these extension lines were, however, barely begun when grave difficulties developed for the Pathological Institute, which shortly led to a greatly diminished state appropriation and an almost complete change of policy. Investigations ceased, accumulated data, material and instruments were packed up and removed from the sumptuous quarters of the Institute at No. 1 Madison Avenue, to the Wards' Island State Hospital, and the staff dispersed. By the end of 1909 the Institute, which started with such bright prospects of scientific accomplishment in every department, became little more than a laboratory serving a few material needs of the state hospitals.

*The College of Physicians and Surgeons, New York City (later the
Medical Department of Columbia University)*

In 1893 Prof. George S. Huntington, head of the Department of Anatomy of the College, began, on the basis of some older heterogeneous collections, the gathering of human skeletal material, which in the course of time has become of great value to Physical Anthropology. The new collections consisted of the bones of the subjects used up in the dissecting room, and the principal bones of the body were identified by tags bearing the number of the subject. The nationality, sex, age and last disease of each individual were recorded.

In 1896 permission to work on these collections and to assist in further increasing the same, was kindly given by Professor Huntington to the

writer. Certain measurements of the body before dissection were introduced, and the collection was assiduously carried on until by 1902 the "bone room" contained the well-identified remains of upwards of 1,200 individuals. Studies on the collection continued until the writer's departure from New York, and extensive series of data of much value were secured, most of which regrettably, due to lack of facilities for elaborating the data, still await publication.

The collections of Professor Huntington's Department include also a series of Indian mummies and skulls which have not been described; and a collection of brains which served as the foundation for various studies, most of which of direct anthropological interest, by Dr. Edward Anthony Spitzka (son of Edward C. Spitzka), at that time Fellow in Anatomy under Professor Huntington, and later Professor of Anatomy in the Jefferson Medical College, Philadelphia.

During the last few years, due to lack of appropriations, this great osteological collection has fallen somewhat into disuse, notwithstanding the efforts of Professor Huntington who has always appreciated its importance and to whom American anthropology is deeply indebted for its creation.

Doctor Spitzka's publications of anthropological interest, which may perhaps best be mentioned in this connection, are as follows:

- Spitzka (Edward Anthony)—The mesial relations of the inflected fissure. Observations upon one hundred brains. *Proc. Assoc. Am. Anat.*, 1901, 105-115. *N. Y. Med. J.*, Jan. 5, 1901, 6-10.
- A preliminary communication of a study of the brains of two distinguished physicians, father and son. *Proc. Assoc. Am. Anat.*, XIV Session, 1900, 70-92, *Phila. Med. J.*, 1901, VII, 680-688.
- The brains of two more celebrities. A letter to the *Phila. Med. J.*, 1901, VII, 791.
- A contribution to the fissural integrality of the paroccipital. Observations upon one hundred brains. *Proc. Assoc. Am. Anat.*, 1901, 118-124, *J. Mental Path.*, June, 1901.
- The redundancy of the preinsula in the brains of distinguished educated men. *N. Y. Med. Record*, June 15, 1901, 940-943.
- Is the central fissure duplicated in the brain of Carlo Giacomini, anatomist. A note on a fissural anomaly. *Phila. Med. J.*, Aug. 24, 1901.
- (With Carlos F. MacDonald)—Report of the post-mortem examination of Leon F. Czolgosz, alias Fred Nieman, the assassin of President McKinley. *N. Y. Med. J.*; *N. Y. Med. Record*; *N. Y. Med. News*; *Phila. Med. Jour.*, Jan. 4, 1902; *J. of Mental Path.*, I, Nos. 4-5; *Am. J. Insanity*, 1902, LVIII, 3; *Lancet* (London), Feb. 1 & 8, 1902.
- Brain-anatomy and "degeneracy" theories. A reply to Dr. E. S. Talbot's criticism in the *Phila. Med. J.*, Jan. 18. *Phila. Med. J.*, Jan. 25, 1902, 152.
- Contributions to the encephalic anatomy of the races. First paper: Three Eskimo brains, from Smith's Sound. *Am. J. Anat.*, 1902, I, 25-71.

- The anatomy of the human insula in its relation to the speech-centers, according to race and individuality. *Proc. Assoc. Am. Anat.*, Dec. 1902; *Am. J. Anat.*, 1903, II, 2, ix-x.
- Brain-weights of brothers and sisters. *Science*, 1903, xvii, 516.
- A study of the brain-weights of men notable in the professions, arts and sciences. *Phila. Med. J.*, May 2, 1903.
- The brain of Professor Laborde. *Science*, 1903, xviii, 346.
- Brain-weights of the Japanese. *Science*, 1903, xviii, 371-373.
- The execution and post-mortem examination of the three VanWormer brothers at Dannemora, N. Y., Oct. 1, 1903. *Daily Med. J. (N. Y.)*, Nov. 20, 1903; *The Daily Medical (N. Y. and London)*, Feb. 8, 1904, I, 1.
- Brain-weights of brothers (II). *Science*, 1903, xviii, 699.
- Assassins not necessarily insane. *Leslie's Weekly*, Dec. 17, 1903, 596 & 603.
- A study of the brain of the late Major J. W. Powell. *Am. Anthropol.*, 1903, v, 585-643.
- The brains of three brothers. *Proc. Assoc. Am. Anat.*, XVII Session, 1903, in *Am. J. Anat.*, 1904, III, iv-v; Hereditary resemblances in the brains of three brothers. *Am. Anthropol.*, 1904, vi, 307-312.
- Post-mortem examination of the late George Francis Train. *Daily Medical*, Feb. 15, 1904.
- The brain-weight of Dr. Taguchi. *Am. Anthropol.*, 1904, vi, 366-367. (Correction in:) *ibid.*, 577-578; and *Science*, 1904, xx, 215.
- The brain of a Swedish statesman. *Science*, 1904, xx, 612-613.
- Report of a study of the brains of six eminent scientists and scholars belonging to the American Anthropometric Society; together with a brief description of the skull of one of them. *Proc. Assoc. Am. Anat.*, XVIII Session, *Phila.* 1904, in *Am. J. Anat.*, 1905, iv, iii-iv.
- Also numerous notes as Editor, Dep't of "Anatomy, Normal and Pathological," in the *Medical Critic*, N. Y., 1902-3.
- Preliminary note on the brains of the Andaman and Nicobar Islands. *Proc. Am. Phil. Soc.*, *Phila.*, 1908, XLVII, 51-58.

American Museum of Natural History, New York

The history of Physical Anthropology at the American Museum is one of more than common interest. It begins, strictly speaking, with the establishment at the Museum of the Department of Anthropology and the appointment, in the spring of 1894, of Prof. F. W. Putnam as Curator of the Department.

The following years showed a most remarkable and unequalled record of development of Anthropology in all its branches at the Museum, which continued until the resignation of Professor Putnam in 1903.

Anthropology in general was included in the scheme of the American Museum from its beginning, but until the early nineties attention was practically restricted to some collections in archeology. During 1892-3

two important expeditions, each of several years duration, were initiated by Bandelier in Bolivia and Peru, and by Lumholtz in Mexico, both resulting in later years in the acquisition of valuable somatological material. In 1894 the new Department of Anthropology was established, "in order to illustrate the history of man in the same way as we are showing the history of animal life."¹⁰ Besides Professor Putnam as Curator, the staff comprised Dr. Franz Boas, as Assistant Curator of the Ethnological Division, and Marshall H. Saville, Assistant Curator of Archeology. New explorations were organized, extending to the southwest and Mexico (the Hyde Expedition); to the northwest and Asia (the Jesup North Pacific Expedition); to the Eskimo, the California tribes; the Arapaho, and to Oregon; while archeological field work was conducted in the Trenton gravels, among the village sites of Long Island and New York, in Florida and other localities. Nearly all of these expeditions and researches resulted in the acquisition of material of value to Physical Anthropology.

The beginning of direct work in Physical Anthropology at the Museum may perhaps be placed in 1898, when an expedition was made to Mexico for the exclusive purpose of securing measurements, photographs, casts and skeletal material from some of the Sierra Madre tribes. This work, which was to supplement the Lumholtz Expedition, was suggested by and intrusted to the writer, and the trip was made part of the way in the company of Doctor Lumholtz. The results were so encouraging, that the next year (1899) arrangements made by Professor Putnam enabled the writer to initiate similar investigations in connection with the Hyde Expeditions among the southwestern tribes. The year after that the writer was placed in charge of the physical anthropology of the Hyde Expedition, and with the whole-hearted support of Professor Putnam and the Hyde family, was enabled to extend the work so as to include all the tribes from southern Utah and Colorado to the states of Michoacan and Morelos in Mexico. These investigations were completed by 1903, when the writer was called to organize the Division of Physical Anthropology at the National Museum.

A noteworthy event in connection with the American Museum in 1902, which had its influence on physical anthropology in this country, was the XIIIth International Congress of Americanists.

In 1903, Professor Putnam resigned his curatorship at the American Museum, to accept an equally responsible position at the University

¹⁰ *Ann. Report Am. Mus. Nat. Hist. for 1895*, p. 17.

of California. His place was taken by Doctor Boas, who however was obliged to devote most of his attention to the ethnological collections and research of the Museum and to his teaching duties at Columbia, with the result that Physical Anthropology at the Museum fell somewhat into neglect. Doctor Boas in turn left the Museum in 1905, to be succeeded the year following by Dr. Clark Wissler, the present Curator.

The human osteological collections of the Museum continued, however, to be added to, and eventually interest in Physical Anthropology was gradually revived. Recently (1916) Mr. Louis R. Sullivan was appointed Assistant Curator in Anthropology, to have charge of the laboratory in Physical Anthropology of the Museum and of the collections and exhibits belonging to this division.

An event of considerable importance to Physical Anthropology at the American Museum was the selection, in 1908, of Prof. Henry Fairfield Osborn as the President of the Trustees of that Institution. Professor Osborn, while not an anthropologist, has always been deeply interested in everything that relates to the variation of the human race and its evolution. He has published a number of important treatises on heredity which are of interest to anthropology, and within recent years has produced three works of considerable direct value to this branch. These and his other writings of anthropological interest are as follows:¹¹

Osborn (Henry Fairfield)—The Cartwright Lectures for 1892 before the Alumni of the College of Physicians and Surgeons, New York: Present problems in evolution and heredity. The contemporary evolution of man. *Med. Rec.*, 1892, xli, 197–204; *Am. Naturalist*, 1892, xxvi, 455–481.

Discovery of a supposed primitive race of men in Nebraska. *Century Mag.*, 1907, lxxviii, No. 3, 371–375.

The age of mammals. 8°, N. Y., 1910, i–xvii, 635 pp.

Skull measurements in man and the hoofed mammals. *Science*, 1912, xxxv, 596; *Ann. N. Y. Acad. Sci.*, 1913, xxii, 341–342.

Men of the old stone age. *Amer. Mus. J.*, 1912, xii, No. 8, 279–295.

Men of the old stone age, their environment, life and art. 8°, N. Y., 1915. 2d ed., 1916, i–xxvi, 545 pp.

The origin and evolution of life. 8°, N. Y., 1917, i–xxxi, 322 pp.

Doctor Wissler, while primarily an ethnologist, is closely interested in Physical Anthropology, and has made several contributions to the subject. His and Doctor Sullivan's publications in this line are:

¹¹ The bibliography of Professor Boas is given under Columbia University; that of the writer under Smithsonian Institution.

- Wissler (Clark)—Correlation of mental and physical tests. Supplement to Psychol. Rev., No. 16; also Columb. Univ. Contr. to Phil., Psychol. & Educ., N. Y. 1901, ix, No. 2, 1-62.
- Growth of boys. Am. Anthropol., 1903, v, 81-88.
- (With F. Boas)—Statistics of growth. Report U. S. Comm. Educ. for 1904, Wash., 1905, 25-132.
- (With Walter Channing)—The hard palate in normal and feeble-minded individuals. Anthropological Papers, Am. Mus. Nat. Hist., 1908, i, part 5, 283-349.
- Measurements of Dakota Indian children. Ann. N. Y. Acad. Sci., 1911, xx, 355-364.
- The American Indian. 8°, N. Y., 1917 (principally ethnological).
- Sullivan (Louis R.)—Variations in the glenoid fossae. Am. Anthropol., 1917, xix, 19-23.
- Growth of the nasal bridge in children. Am. Anthropol., 1917, xix, 406-409.

An auspicious recent addition to the anthropological staff of the American Museum is that of Prof. J. H. McGregor of Columbia University, as Research Associate in Anthropology. Though an active member of the faculty of Columbia University and primarily a paleontologist, Professor McGregor is deeply interested in the morphology of the early types of man.

Professor Boas, though separated from the American Museum, has continued his interest in the valuable skeletal material gathered by the Jesup North Pacific Expedition, and during the last three years has had Dr. Bruno Oettking assisting him in working over this material at the Museum. The results are to appear eventually as the final volume of the *Memoirs of the Jesup Expedition*. Dr. Oettking since his connection with the Museum has published the following papers relating to Physical Anthropology:

- Suggestions for cataloguing of anthropological material. Am. Anthropol., 1916, xviii, 398-410.
- Living races of man. New Intern. Encyc., 1916.
- Herman Klaatsch. Am. Anthropol., 1916, xviii, 422-425.
- The study of anthropology in America. The Nation, 1917, civ, 542-543.
- Preliminary remarks on the skeletal material collected by the Jesup Expedition. Proc. XIX Int. Cong. Amer. (1915), Wash., 1917, 621-624.

Finally, this sketch should not close without reference to the work of Prof. W. K. Gregory of the Department of Vertebrate Paleontology of the American Museum who, though not a member of the anthropological staff of the Museum, is working in close coöperation therewith. For several years he has devoted the greater part of his time to the

study of the primates from an evolutionary and phylogenetic point of view. His earlier papers dealt with the Lemuroidea, but recently he has made important contributions to the phylogeny of living and extinct anthropoids, with special reference to the origin of man. His publications bearing on anthropological problems are as follows:

- I. On the relationship of the Eocene Lemur *Notharetus* to the Adapidae and to other primates. II. On the classification and phylogeny of the Lemuroidea. *Bull. Geol. Soc. Amer.*, 1915, xxvi, 419-446.
- Studies on the evolution of the primates. *Bull. Am. Mus. Nat. Hist.*, 1916, xxxv, Art. xix, 239-355.
- Evolution of the human face. *Am. Mus. J.*, 1917, xvii, 376-388. Also in *Dental Cosmos*, 1918, lx, 115-125.

The present Board of Trustees of the American Museum has shown much interest in the development of somatological collections and research, so that there are good prospects for renewed important activities in this line.

Columbia University

The Department of Anthropology of Columbia University was established in 1896 and from that date until 1902 was under the direction of James McKeen Cattell, Professor of Psychology, but its development is essentially associated with Dr. Franz Boas.

Prior to 1896 a brief introductory course in Anthropology was given by Dr. Livingston Farrand, but this touched only slightly on the physical aspects of the subject. In 1896 Doctor Boas was appointed Lecturer on Physical Anthropology, and in 1899 he became Professor of Anthropology (in the broader sense) at the University, a position which he still holds. Previously, Doctor Boas had served, as has already been partly mentioned, under the Committee of the British Association appointed for the purpose of collecting information on the North-Western tribes of Canada (1888); as Docent of Anthropology at Clark University (1882-92); as Chief Assistant of the Department of Anthropology of the Chicago Exposition (1891-4); and as Assistant Curator in Ethnology at the American Museum of Natural History (since 1894).

The Columbia University catalogue for 1896-7 announced several courses in anthropology, giving as the personnel of the department the names of Livingston Farrand, Instructor; Franz Boas, Lecturer; and William Z. Ripley, Prize Lecturer. Of the several courses offered, two were in Physical Anthropology—one a general introductory course with

lectures, essays and discussions, two hours weekly; the other a more advanced course including the application of statistical methods to biological problems, three hours weekly, with lectures, reports and laboratory work. Both these courses were given by Doctor Boas.

As Doctor Boas' call to Columbia was almost simultaneous with his call to the American Museum of Natural History, the anthropological collections of the latter institution became available to Columbia students, which obviated the necessity of forming similar collections at the University. When however Professor Boas in 1905 resigned from the Museum, a lack of anthropological material at hand in the University became a disadvantage which hindered, no doubt, a full development there of the branch of Physical Anthropology.

The present anthropological staff in Columbia University includes Professor Boas, who is the Executive Officer of the Department, and several associates. Some eighteen courses are listed, two of which (the same as those above mentioned) are in physical anthropology and are still conducted by Doctor Boas. The collections of the American Museum are, as before, available to students of the Department, but as the two institutions are far apart, their use is restricted. Moreover, Doctor Boas' researches of latter years have been predominantly statistical and that phase of the subject has in consequence been given more attention at the University than other aspects of physical anthropology.

It is to be regretted that Professor Boas' activities were never devoted fully to physical anthropology, much of his time being given to linguistics, mythology and general ethnology of the American aborigines. This, and the limited laboratory facilities at Columbia in conjunction with lack of collections, resulted in the issue from the University, during the last two decades, of a number of original workers in linguistics and ethnology, but none in somatology.

Some years ago Professor Boas delivered two courses of lectures on physical anthropology before the students of the College of Physicians and Surgeons (now Medical Department of the Columbia University), with the object of interesting them more closely in the subject, but due to the preoccupation of this class of men with their own exacting studies the effort was not successful; and the same may be said of his more recent effort in like direction and under somewhat similar conditions, in Mexico.

The published contributions of Professor Boas to physical anthropology are both numerous as well as important. They cover a wide

range and in general are characterized by a distinct leaning towards a mathematical rather than anatomical treatment of the subject matter. His bibliography, so far as it touches our branch, follows:

- Indian skulls from British Columbia. Trans. N. Y. Acad. Sci., 1888-1889, VIII, 4-6.
- Deformation of heads in British Columbia. Science, 1889, XIII, 364-365.
- First General Report on the Indians of British Columbia. 5th Rep. N. W. Tribes of Canada, 1889, 5-97 (801-893). (These papers are in the main ethnological, but each contains parts dealing with physical anthropology.)
- Cranium from Progreso, Yucatan. Proc. Am. Antiq. Soc., 1889-90, VI, 350-357.
- A modification of Broca's stereograph. Am. Anthrop., 1890, III, 292-293.
- Second general report on the Indians of British Columbia. 6th Rep. N. W. Tribes of Canada, 1890, 562-715.
- Physical characteristics of the Indians of the North Pacific Coast. Am. Anthrop., 1891, IV, 25-32.
- Mixed races. Science, 1891, XVII, 179.
- Anthropological investigations in schools. Science, 1891, XVII, 351-352.
- Third Report on the Indians of British Columbia. 7th Rep. N. W. Tribes of Canada, 1891, 2-43.
- The growth of children. Science, 1892, XIX, 256-257, 281-282; XX, 351-352.
- Anthropologie in Amerika. Corr.-Bl. d. d. anthrop. Ges., 1892, XXIII, 114-116.
- Remarks on the theory of anthropometry. Quart. Pub. Am. Stat. Assn., 8vo, 1893, III, 569-575.
- The Indian tribes of the Lower Fraser River. 9th Rep. N. W. Tribes of Canada, 1894, 1-11.
- The correlation of anatomical or physiological measurements. Am. Anthrop., 1894, VII, 313-324.
- The anthropology of the North American Indian. Mem. Internat. Cong. Anthrop., 8vo, 1894, 37-49.
- The half-blood Indian and anthropometric study. Pop. Sci. Monthly, 1894, XLV, 761-770.
- Human faculty as determined by race. Proc. Am. Assn. Adv. Sci., 1894, XLIII, 301-327.
- On Dr. William Townsend Porter's investigation of the growth of the school children of St. Louis. Science, 1895, n. s., I, 225-230; Corr.-Bl. d. d. anthrop. Ges., 1895, XXVI, 41-46.
- The growth of first-born children. Science, 1895, I, 402-404.
- Fifth report on the Indians of British Columbia. 10th Rep. N. W. Tribes of Canada, 1895, 2-62; charts of detailed measurements.
- Die Beziehungen des Längenbreitenindex zum Längenhöhenindex an Schädeln. Verh. d. Berl. Ges. f. Anthrop., Ethn. u. Urg., 1895, XXVII, 304.
- Zur Anthropologie der nordamerikanischen Indianer. Verh. d. Berl. Ges. f. Anthrop., Ethn. u. Urg., 1895, XXVII, 366-411.
- Anthropological observations on the Mission Indians of Southern California. Proc. Am. Assn. Adv. Sci., 1895, XLIV, 261-269.
- Form of the head as influenced by growth. Science, 1896, n. s. III, 929-931.

- Sixth report on the Indians of British Columbia. 11th Rep. N. W. Tribes of Canada, 1896, 1-17.
- The limitations of the comparative method of anthropology. *Science*, 1896, iv, 901-908.
- The growth of children. *Science*, 1897, v, 570-573.
- The growth of Toronto children. Rep. U. S. Com. Educ. for 1896-97, Wash., 1898, 1541-1599.
- Physical characteristics of the tribes of British Columbia. 12th Rep. N. W. Tribes of Canada, 1898, 628-666 (with Livingston Farrand). Summary of the work of the Committee, *Ibid.*, 667-682, 12 charts (Index to the 12 Reports, *Ibid.*, 683-688).
- Some recent criticisms of physical anthropology. *Am. Anthropol.*, 1899, i, 93-106.
- The cephalic index. *Am. Anthropol.*, 1899, i, 448-461.
- Anthropometry of Shoshonean tribes. *Am. Anthropol.*, 1899, i, 751-758.
- A. J. Stone's measurements of natives of Northwest territories. *Bull. Am. Mus. Nat. Hist.*, 1901, xiv, 53-68.
- The relations between the variability of organisms and that of their constituent elements. *Science*, 1902, xv, 1-5.
- Statistical study of anthropometry. *Am. Phys. Ed. Rev.*, 1902, vi, 174-180.
- The foundation of a national anthropological society. *Science*, 1902, xv, 804-809.
- The development of the department of anthropology of the American Museum of Natural History. *Am. Mus. J.*, 1902, ii, 47-53.
- Rudolf Virchow's anthropological work. *Science*, 1902, xvi, 441-445.
- Heredity in head form. *Am. Anthropol.*, 1903, v, 530-538.
- The history of anthropology. *Science*, 1904, xx, 513-524; *Cong. Arts & Sci.*, 1906, v, 468-482.
- Statistics of growth. Rep. U. S. Com. of Educ. for 1904, Wash., 1905, 25-132.
- The horizontal plane of the skull and the general problem of the comparison of variable forms. *Science*, 1905, xxi, 862-863.
- Anthropometry of Central California. *Bull. Am. Mus. Nat. Hist.*, 1905, xvii, 347-380.
- Physical types of the Indians of Canada. *An. Arch. Rep.*, 1905-1906, 84-88.
- The measurements of variable quantities. *Archiv. Phil. Psychol. & Sci. Methods*, June, 1906, No. 5.
- Heredity in Anthropometric traits. *Am. Anthropol.*, 1907, ix, 453-469.
- On crania of Lower Fraser River Indians. *Publ. Jesup North Pacific Exped.* 1908, ii, 188-190.
- Determination of the coefficient of correlation. *Science*, 1909, xxix, 823-824.
- Race problems in America. *Science*, 1909, xxix, 839-849.
- Changes in bodily form of descendants of immigrants. Senate document No. 208, 61st Congr., 2d Session, Wash., 1910, 113 pp.; also issued by Columbia Univ. Press, 1912, abstr. in *Am. Anthropol.*, 1912, xiv, 530-562; also Abstracts of Reports of the Immigration Comm., Wash., 1911, 5-58; also, *Veränderungen der Körperform der Nachkommen von Einwanderern in Amerika. Zeitschrift für Ethnologie*, 1913, xlv, 1-22.
- Anthropology. *Cyclop. of Education* (edited by Paul Monroe, Ph.D.), 1911, i, 132-134.

- Instability of human types. Papers on inter-racial problems communicated to the First Universal Races Congress, London, 1911, 99-103.
- The growth of children. *Science*, 1912, xxxvi, 815-818.
- Growth. *Cyclop. of Education*, 1912, iii, 187-190.
- Erwiderung auf Dr. H. Ten Kate's Nachtrag zum Artikel "Schädelform und Umwelt-einfluss." *Archiv f. Rassen-u. Ges.-Biol.*, 1912, ix, 628-630.
- Die Analyse anthropometrischer Serien, nebst Bemerkungen über die Deutung der Instabilität menschlicher Typen. *Archiv f. Rassen-u. Ges.-Biol.*, 1913, x, 290-302.
- Einfluss von Erbllichkeit und Umwelt auf das Wachstum. *Zeitsch. f. Ethnol.* 1913, xlv, 615-626.
- The head-forms of Italians as influenced by heredity and environment. *Am. Anthropol.*, 1913, xv, 163-188 (with Helene M. Boas).
- Remarks on the anthropological study of children. *Trans. XVth Intern. Congr. Hyg. & Demogr.*, 1912, repr. 1-8.
- On the variety of lines of descent represented in a population. *Am. Anthropol.*, 1916, xviii, 1-9.
- Eugenics. *Scientific Monthly*, Nov., 1916, 471-478.
- New evidence in regard to the instability of human types. *Proc. Nat. Acad. Sc.*, 1916, ii, 713-718.
- Modern populations of America. *Proc. II Pan-Am. Sc. Congr.*, Wash., 1917, 9-15. Repr. in *Sc. Amer.*, 1917
- The relation between civilization and stature. *J. Sociol. Med.*, xviii, 397-401.

Between 1903 and 1904 we find a second Professor of "Anthropology" at Columbia University, in the person of Dr. Livingston Farrand. Doctor Farrand was however interested essentially in the more psychological aspects of Anthropology. His contributions to somatology are limited to the following:

- Farrand (Livingston) (with J. McK. Cattell)—Physical and mental measurements of the students of Columbia University. *Psychol. Rev.*, N. Y., 1896, iii, 618-648.
- (With F. Boas)—Physical characteristics of the tribes of British Columbia. 12th and final Report of the Committee appointed by the B. A. A. S. to investigate the physical characters, etc. of Northwestern tribes of the Dominion of Canada, *Proc. B. A. A. S.*, London, 1898; 629-644.

For a time Dr. Clark Wissler was also connected with the Department of Anthropology at Columbia, assisting partly in somatological work. One of the results was his paper on Correlation of physical and mental observations on the students.

New York University, New York City

Since 1910, there exists, in connection with the School of Pedagogy and the Graduate School of the University, a Department of Pedagogi-

cal Anthropology, in charge of Prof. Paul R. Radosavljevich, who since 1914 has been assisted by Dr. Aristine P. Munn-Recht, Dean of the Women of the University. The objects of this department are:

1. To acquaint the graduate students, as thoroughly as may be possible, with the value and results of anthropometric observations on children and adolescents;

2. To train the graduate class in anthropometry, particularly that of children;

3. To train the class in biometric and other methods; and finally

4. To assist the ablest students in carrying on original investigations in child study.

The course is divided into:

a. Anthropological Study of School Children; —

b. Practical Course in Pedagogical Anthropology, Normal and Abnormal Children; and —

c. Research.

Professor Radosavljevich, with a number of his graduates and students, have contributed the following to physical anthropology:

Carley (Leon A.)—Mental, physical and moral delinquency, and courts. A thesis for Ph.D., 1914 (partially published in the *Am. J. Common Law and Criminology*). Includes measurements of about 500 inmates of N. J. Reformatory, Rahway, N. J.

Radosavljevich (P. R.)—Pedagogical anthropology. *Proc. IVth Intern. Cong. for School Hygiene*, Buffalo, N. Y., Aug. 25-29, 1913, 21 pp.

Professor Boas' New theory of the form of the head—a critical contribution to School Anthropology. *Am. Anthropol.*, 1911, XIII, 394-436.

Changes in bodily form in descendants of immigrants. *Science*, 1912, XXXV, 821-4.

Die Entwicklung des Kindes innerhalb der Schuljahre. *Rep. "Monatshefte für Pädagogik,"* etc., 1913, XIV, 87-98, 123-7, 159-64.

Growth and education. "*Prosvetni Glasnik*," organ of the Serbian Ministry of Education, Belgrade, 1900, 322-42, 408-24, 630-64, 707-21; in Serbian.

Anthropological study of school children. "*Nastavni Vjestnik*," organ of the Croatian Professors, Zagreb, 1910, 569-82, 653-82, 724-47, in Croatian.

Anthropology from the scientific point of view. "*Učitelj*," organ of the Teachers' Assoc. of Serbia, Belgrade, 1911, 9-17, 100-109, 281-92; in Serbian.

Sex differences in the light of physical anthropology. *Ibid.*, 1912, 87-104, 180-205; in Serbian.

Pedagogic anthropology in the United States. *Proc. XIXth Intern. Cong. Amer.*, Wash., 1917, 606-10.

Study of the American and the European child. *Proc. 2nd Pan-Amer. Sci. Cong.*, Wash., 1917, I, 124-25.

Stevenson (Beatrice L.)—Constancy or variability in Scandinavian type. *Intern. Arch. für Ethnol.*, 1914, XXII, 22 pp.

Conclusions regarding the head index of Scandinavians in Europe and America.

Ibid., 1915, xxiii, 17 pp.

Socio-Anthropometry; a thesis for Ph.D., 12mo, Boston, 1915, 153 pp.

The eye and hair color in children of the old Americans. Proc. XIXth Int. Congr. Amer., Wash., 1917, 603-605.

Museum of the American Indian, Heye Foundation, New York

The Museum of the American Indian, Heye Foundation, owes its origin to a small collection of archeological and ethnological objects brought together by George C. Heye, Esq., about fifteen years ago. Research in American archeology and ethnology was begun in 1904, and has continued without cessation; the Museum was incorporated in 1916. From the outset the utmost care has been devoted to the collection and preservation of skeletal remains of American aborigines. Unprepared at the beginning to give the necessary attention to material of this kind, with respect both to its permanent care and study, Mr. Heye generously presented an important part of the collections in physical anthropology to the United States National Museum. Later such remains have been retained with the view of having them form the nucleus for a division of physical anthropology. Such a division was actually established in 1916, under the charge of Dr. James B. Clemens, assisted by Dr. Bruno Oettking; but while additional skeletal material is constantly being accumulated, exigencies growing out of the war prevented the development of the new section as had been planned, so that the utilization of the collections and publication of results are held in abeyance.

Cold Spring Harbor

The Station for Experimental Evolution at Cold Spring Harbor was established by the Carnegie Institution in 1904 as a part of the Department of Experimental Biology of the Institution. Its objects were "the study of heredity, development, and evolution by experimental methods,"¹² and the work, essentially biological in the usual sense of the word, gradually broadened so as to include the human family. The station has since its inception been under the direction of Dr. Charles B. Davenport, and the studies of man so far undertaken were carried on by Doctor Davenport, with the assistance of Mrs.

¹² *Carnegie Year Book*, III, Wash., 1905, p. 37.

Davenport and other collaborators. His publications that are of interest to physical anthropology, as furnished by himself, follow:¹³

- (With Gertrude C. Davenport)—Heredity of eye color in man. *Science*, 1907, xxvi, 589-592.
- (With Gertrude C. Davenport)—Heredity of hair form in man. *Amer. Nat.*, 1908, xlii, 341-349.
- (With Gertrude C. Davenport)—Heredity of hair color in man. *Amer. Nat.*, 1909, xliii, 193-211.
- (With Gertrude C. Davenport)—Heredity of skin pigmentation in man. *Amer. Nat.*, 1910, xliiv, 641-672.
- Heredity in relation to eugenics. N. Y., 1911.
- (With David F. Weeks)—A first study of heredity in epilepsy. *J. Nerv. & Ment. Dis.*, Nov. 1911.
- The origin and control of mental defectiveness. *Pop. Sci. Monthly*, Jan. 1912, 87-90.
- The trait book. *Eugenics Record Office Bulletin*, Feb. 1912, No. 6, 52 pp.
- (With Florence H. Danielson)—The hill folk. Report on a rural community of hereditary defectives. *Eugenics Record Office Memoir* No. 1, 1912, 4°, 56 pp., 3 charts.
- (With A. H. Estabrook)—The Nam family. A study in Cacogenics. *Eugenics Record Office Memoir*, No. 2, 1912, 4°, 85 pp., 4 charts.
- Man from the standpoint of modern genetics. *Science*, 1914, xxxix, 223-224.
- Heredity of skin color in negro-white crosses. *Carnegie Institution of Wash.*, 1913, Publ. No. 188.
- The feebly inhibited: (1) Nomadism or the wandering impulse, with special reference to heredity. (2) Inheritance of temperament. *Carnegie Inst. of Wash.*, 1915, Publ. No. 236.
- Skin color of mulattoes. *J. Hered.*, 1914, v, 556-558.
- The value of scientific genealogy. *Science*, 1915, xii, 337-342.
- A dent in the forehead. *J. Hered.*, 1915, vi, 163-164.
- (With H. S. Conard)—Hereditary fragility of bone (*fragilitas osseum*, *osteopsathyrosis*). *Eugenics Record Office Bull.* No. 14, 1915.
- The hereditary factor in pellagra. *Arch. Inter. Med.*, 1916, xviii, 1-29.
- The personality, heredity and work of Charles Otis Whitman, 1843-1910. *Amer. Nat.*, 1917, li, 5-30.
- The effect of Race intermingling. *Proc. Amer. Phil. Soc.*, 1917, lvi, 364-368.
- Inheritance of stature. *Genetics*, 1917, ii, 313-389.
- (With Eliz. B. Muncey)—Huntington's Chorea in relation to heredity and eugenics. *Amer. J. Insanity*, 1916, lxxiii, 195-222.

In 1910, Mrs. E. H. Harriman established at Sag Harbor and in virtual connection with the Station for Experimental Evolution, the "Eugenics Record Office," for the purpose of research in human he-

¹³ Additional publications of related interest by Dr. Davenport and his associates, are given in the various *Year Books of the Carnegie Institution*.

redity and eugenics. This Office, which like the Station is under the direction of Doctor Davenport, has published a series of Memoirs and Bulletins all of which are of direct interest to physical anthropology. Most of these publications have already been given in Doctor Davenport's bibliography; the additional ones are as follows:

Eugenics Record Office Bulletins

- Bull. 1—Goddard (Henry H.). Heredity of feeble-mindedness. 8°, 1911, 14 pp.
 2—Symposium. The study of human heredity. 8°, 1911, 17 pp.
 3—Cannon (Gertrude L.) and A. J. Rosanoff. Preliminary report of a study of heredity in insanity, etc. 8°, 1911, 11 pp.
 5—Rosanoff (A. J.) and Florence I. Orr. A study of heredity of insanity in the light of the Mendelian theory. 8°, 1911, 221-261.
 8—Cotton (Henry A.). Some problems in the study of heredity in mental diseases. 8°, 1912, 59 pp.
 10A—Laughlin (Harry H.). I. The scope of the Committee's work. Report of the Committee to study and to report on the best practical means of cutting off the defective germ-plasm in the American population. 8°, 1914, 64 pp.
 10B—Laughlin (Harry H.). II. The legal, legislative and administrative aspects of sterilization. Report of same Committee as in bulletin 10 A. 8°, 1914, 150 pp.
 15—Finlayson (Mrs. Anna Wendt). The Daek family. A study in hereditary lack of emotional control. 8°, 1916, 46 pp.
 16—Munee (Elizabeth B.). A study of the heredity of Pellagra in Spartanburg County, South Carolina. 8°, repr. from Archives of Internal Med., xviii, No. 1, 31-75.

PHILADELPHIA, PENNSYLVANIA

Since the death of Harrison Allen, progress in Physical Anthropology in Philadelphia has been almost entirely limited to increase of collections; there is at present no active center for the branch in that city, formerly a home of our science, condition which urgently calls for a remedy.

Academy of Natural Sciences, Philadelphia

Clarence B. Moore. The earlier history of Physical Anthropology in connection with the Academy has been recorded in Section B of this memoir, and little remains to be added, except that within the last three decades the older collections of the Institution have been enriched by numerous crania and other skeletal material resulting from the explorations of Mr. Clarence B. Moore.

Mr. Clarence B. Moore, one of the foremost archeologists of the country, has contributed substantially to the progress of physical anthropology in the United States, by his careful and extensive collections of skeletal material in the old mounds of Florida, Alabama, Arkansas, Mississippi and Kentucky. During recent years such material has been added by Mr. Moore to the collections of the United States National Museum, and has already served to elucidate some important problems in the anthropology of the southeastern states. Several publications resulting from the study of the material have appeared in the Journal of the Academy.

Dr. W. L. Abbott

Another great friend of physical anthropology in Philadelphia, though not a working anthropologist himself, is Dr. W. L. Abbott. During his many years of biological explorations in southeastern Asia, Borneo, Sumatra and other islands, Doctor Abbott has collected not only hundreds of photographs of the natives and some of their skeletal material, but has conferred a great service on anthropology as well as on biology by the collection of a most important series of skeletons and brains of the anthropoid and other apes. These precious specimens now form parts of the collections of the divisions of Physical Anthropology and Mammalogy in the U. S. National Museum. Doctor Abbott is still active and there is a strong hope that further material assistance will be rendered by him to physical anthropology.

The Wistar Institute of Anatomy and Biology, Philadelphia

Remarks on the earlier history of Physical Anthropology in connection with the Wistar Institute will be found under Section B.

The more recent developments in this direction in the Institute, consist of a very practical, attractive and useful rearrangement of the older collections and exhibits; of the addition to the collections of important series of primate skeletal material, of a dozen or more complete skeletons of the Chinese, and of a series of fifty Philippino brains; and in the acquisition, in 1915, of the large osteological collections from the Museum of the University of Pennsylvania.

Recently the important series of Eskimo crania and bones at the Wistar Institute has been studied by Dr. Ernest W. Hawkes and Mr.

Ralph Linton, and the results were published by Doctor Hawkes under the title of "Skeletal Measurements and Observations on the Point Barrow Eskimo with Comparisons from Other Eskimo Groups," in the *American Anthropologist*, 1916, xviii, 203-244.

Connected with the Wistar Institute since 1906 as Professor of Neurology, is Dr. Henry H. Donaldson, one of the foremost investigators in his line, who has made several contributions of value to Physical Anthropology. These are:

The growth of the brain; a study of the nervous system in relation to education. 1897, 12°, London, 374 pp.

A comparison of the white rat with man in respect to the growth of the entire body. Repr. from Boas Memorial Volume, N. Y., 1906, 5-26.

Brain and nervous system in rat and man. Address before the Phila. Neurological Soc. Jan. 1911, *J. Nerv. & Ment. Dis.*, 1911, xxxviii, 257-266.

An anatomical analysis of growth. *Trans. XVth Intern. Congr. Hyg. & Demog.* (held Wash., 1912); repr. 6 pp.

In addition Professor Donaldson and his associates have published in the *American Journal of Anatomy* and the *Anatomical Record*, a number of articles on the growth and on the central nervous system of animals, particularly the albino rat, which are of interest to the student of human growth and of the human brain and nervous system.

A mention must also be made of the collection of brains of distinguished individuals which is in the possession of the Wistar Institute. A portion of this collection was studied by Dr. E. A. Spitzka (see p. 286).

Spitzka also established a collection of brains in the anatomical department of the Jefferson Medical College of Philadelphia, while Professor of Anatomy at that Institution.

The University Museum, Philadelphia

Until 1915 the University Museum possessed a valuable collection of skeletal remains from some of the northern tribes of Mexico, the Eskimo, the Melanesians, and other races, and for a time there was some thought that, under the able directorship of Dr. Geo. B. Gordon, there might eventually be developed at the Museum a Division devoted to physical anthropology. In the year mentioned, however, on account of inadequate storage and laboratory facilities, and with the view of a concentration of effort in this scientific field, rather than a dispersion of the collections and a divided effort, it was decided by the Museum

authorities to transfer the entire collection to the Wistar Institute of Anatomy and Biology, of Philadelphia, which already possessed important collections of skulls and other skeletal remains.

Between 1913 and 1917 Dr. William C. Farabee, conducted for the Museum an expedition to the tribes of northern South America, which resulted in the acquisition of numerous observations of value to Physical Anthropology. These are being prepared for publication.

Important excavations are now being conducted for the Museum in Egypt by the Eckley B. Cox Jr. Expedition, which is expected to result in the acquisition of valuable well dated skeletal material from the earlier dynasties; and a recent expedition for the Museum to the northwestern Eskimo will doubtless result in the collection of additional skeletal remains from this important group of American aborigines.

BALTIMORE

Baltimore, though a great and rich city, and though possessing one of the foremost universities and medical schools in the country—the Johns Hopkins—has, strangely, never been a fertile field for anthropological research or even collections. Probably this is to be explained by its proximity to Washington.

Within late years, nevertheless, conditions have been slowly changing for the better. Prof. Franklin P. Mall, whose recent untimely death is a great loss to American science, was always a warm friend of Anthropology, and for several years before his death had associated with himself, in his researches on human development, a trained anthropologist. He also published, however, personally a number of papers which had a direct bearing on physical anthropology. They are as follows:

- On the transitory or artificial fissures of the human cerebrum. *Am. J. Anat.*, 1903, II, 333-340.
- On the angle of the elbow. *Am. J. Anat.*, 1905, IV, 391-404.
- On ossification centers in human embryos less than 100 days old. *Am. J. Anat.*, 1906, V, No. 4, 433-458.
- On measuring human embryos. *Anat. Rec.*, 1907, I, 129-140.
- On several anatomical characters of the human brain, said to vary according to race and sex, with especial reference to the weight of the frontal lobe. *Am. J. Anat.*, 1909, IX, 1-32.
- On the development of the human heart. *Am. J. Anat.*, 1912, XIII, 249-298.
- On the frequency of localized anomalies in human embryos and infants at birth. *Am. J. Anat.*, 1917, XXII, 49-72.

Professor Mall's first collaborator in anthropology was Dr. Michal Reicher, of Polish birth, who in 1915 returned to his country to take part in the war. The results of his investigations have not as yet been published. In 1917, Dr. Reicher's place was given to Dr. Adolf H. Schultz, of Switzerland, who since has published the following papers of anthropological bearing:

Ein paariger Knochen am Unterrand der Squama occipitalis. *Anat. Rec.*, 1917, xii, 357-362.

An appeal to physicians for embryological material, especially from the negro. Leaflet, 4 pp., Carnegie Inst. of Wash., 1917.

The Fontanella metopica and its remnants in an adult skull. *Am. J. Anat.*, 1918, xxiii, 259-271.

The position of the insertion of the pectoralis major and deltoid muscles on the humerus of man. *Am. J. Anat.*, 1918, xxiii, No. 1, 155-173.

Studies in the sex-ratio in man. *Biolog. Bull.*, 1918, xxxiv, 257-275.

One of the former (1904-5) assistants of Professor Mall is Dr. Robert Bennett Bean, now Professor of Anatomy at the University of Virginia. Dr. Bean, who from the beginning of his scientific career has been actively interested in physical anthropology, has made in the United States and in the Philippine Islands extensive somatological studies on the brain, the ear, the teeth, Philippine racial types, and on growth and proportions of the human body. It is much to his credit that he carried out his numerous studies in addition to the heavy duties of the teaching anatomist, and under other disadvantages. The bibliography of his contributions to our branch of research follows:

On a racial peculiarity in the brain of a negro. *Proc. Ass. Am. Anat.*, in *Am. J. Anat.*, 1905, iv, 4.

Observations on a study of the subclavian artery in man. *Johns Hopkins Hospital Bull.*, 1904, xv, No. 159, 203-205.

A composite study of the subclavian artery in man. *Am. J. Anat.*, 1905, iv, 303-328.

Some racial peculiarities of the negro brain. *Am. J. Anat.*, 1906, v, 353-432, 16 fig., 12 charts; also *Century Mag.*, 1906, lxxii, 778-784.

The training of the negro. *Century Mag.*, 1906, lxxii, 947-953.

A racial peculiarity in the temporal lobe of the negro brain. *Anat. Rec.*, 1907, i, 57.

A preliminary report on the measurements of about 1000 students at Ann Arbor, Mich. *Anat. Rec.*, 1907, i, 67-68.

Lectures on Heredity. *Teachers' Assembly Herald*, Philippine Islands, 1908.

A theory of heredity to explain the types of the white race in North America. *Philippine J. Sci.*, 1908, iii, Sec. A, 215-233.

The Benguet Igorots: A somatologic study of the live folk of Benguet and Lepanto-Bontoc. *Philippine J. Sci.*, 1908, iii, Sec. A, 413-467.

- Methods of studying the central nervous system. *Philippine J. Sci.*, 1909, iv, Sec. B, 9-19.
- A scheme to represent type heredity in man. *Science*, 1909, xxix, 942-944.
- A cephalograph. *Philippine J. Sci.*, 1909, iv, Sec. A, 447-449.
- Filipino types. I. Manila students. *Ibid.*, 263-296.
- Filipino types. II. Found in Malecon Morgue. *Ibid.*, 297-337.
- Filipino types. III. Racial anatomy in Taytay. A. The men. *Ibid.*, 359-446, 16 figs., 18 plates.
- Filipino types. IV. Racial anatomy in Taytay. B. The women. *Ibid.*, 1910, v, 1-25, 7 plates. (With F. S. Planta.)
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Still another former associate of Professor Mall whose work has been of importance to Physical Anthropology, is Dr. C. H. Bardeen, since 1904 Professor of Anatomy at the University of Wisconsin. His publications, dealing with the development of the skeleton, will be referred to in the final section of this work.

EARLY OBSERVATIONS IN AMERICAN PHYSICAL ANTHROPOLOGY

WM. H. BABCOCK

It seems worth while to review the recorded impressions made by the physique of the natives of the American coast on the Europeans who had a very early opportunity of meeting them in a primitive state. The present sketch can make no pretension to be exhaustive and ends with the first quarter of the sixteenth century.

We do not know when voyagers first began to cross the Atlantic. There are faint and inconclusive indications that the Norsemen at the end of the tenth century were not the first on the ground; and presumably the earlier arrivals must, like them, have made acquaintance with the aborigines. But perhaps the earliest recorded meeting of this kind is found in the Floamanna Saga, attributed by Vigfusson in part to the thirteenth century, but relating the adventures of the hero Thorgisl, apparently not far from the year 990.

It will be recalled that Eric the Red (or Ruddy) shortly before this time had discovered and explored the relatively fertile fjord country which he denominated Greenland—a term of uncertain geographical limits—and founded there a colony which endured, if it did not quite prosper, for nearly five hundred years. Of the many adventurous men who accepted his invitation to settle there and shared his incitement, not a few came to grief and suffered divers kinds of tragedy and tribulation before they reached their journey's end. One of these was Thorgisl, who began by shipwreck on the forbidding east coast of Greenland, as we now apply the name, opposite Iceland whence he had sailed.

The saga tells us that the castaways "made a hall together" for winter quarters; but it was no cheery home. Many evil things happened there, including madness and the visits of the dead, until the horror culminated in the murder of Thorgisl's young wife as she lay beside her child and the flight of the thralls who had slain her.

Here is one of the wild, if not unholy, experiences in this Odyssey.

"In the morning when Thorgisl came out he saw a great mass of drift in an ice-hole; and by it were two giant women in kirtles of skin and they were trussing

up mighty burdens. Thorgisl ran up and cut at one of them with his sword, Earth Fast Loom, as she was bearing the burden on her back, and slashed off her arm. Down fell the burden and she ran away."

This seems real and I am inclined to accept it, though the saga-men were realistic literary inventors on occasion. May we set down these feminine figures as misunderstood Eskimo, exaggerated by the original narrator's superstition and some centuries of later oral tale-repeating? To the overstrained observer they would naturally be something outlandish, uncouth and unholy.

We find meagre data of the western coast Eskimo, perhaps of the twelfth century, in the *Historia Norwegiae*, a thirteenth century manuscript discovered in Scotland. "Beyond the Greenlanders towards the north," it says, the hunters came across a kind of small people called Skrellings. When they are wounded alive their wound becomes white without any issue of blood; but the blood scarcely ceases to stream out of them when they are dead.

This little matter of wild surgery is magical enough; but here at least we get a notable reduction of size. However, not all Eskimo are "small."

The exploring saga of Eric the Red is our main authority for America in the dawn of the eleventh century. Markland, probably Newfoundland, was visited by Thorfinn Karlsefni's retreating party of settlers *en route* for Greenland about 1006. Landing, they "found five Skrellings, of whom one was bearded, two were women and two were children." Possibly "bearded" should be understood as a conventional equivalent for "adult masculine;" or it may be explained by a mask; or there may have been some interesting mixture of races. Beards did not often belong to Indians of full blood according to the reports of later visitors. It is probable that this passage is not one of the oldest in the saga, which has some parts identified as belonging in composition to the eleventh century.

A little earlier a detachment of the explorers had entered the gulf of St. Lawrence and anchored, as nearly as we can guess, in the mouth of the Mabou or Margarie river of western Cape Breton. An Uniped appeared (for his picture see the margin of the old Hereford map) "who skipped down to the bank of the river where they were lying. Thorvald, a son of Eric the Red, was sitting at the helm and the Uniped shot an arrow into his inwards. Then the Uniped ran away toward the north. The last seen of him he ran down into a creek." We have here some kind of a native who could use all his limbs very nimbly yet

struck the fancy of the Norseman as exceedingly abnormal, so that they readily hung on him one of the preposterous fictions of the time, long current in their own home.

There is another account of Thorvald's killing by a native archer, which lacks the mythological element. It is linked to a little massacre on the New England coast, which we have in two varying versions. They agree as to the destruction of a small party of Indians sleeping beside their canoes, but give us no somatological data.

This slaughter, according to the older account, occurred during the northward withdrawal of the discomfited Norse colonists from a point where they had hopefully maintained themselves for nearly a year on the shore of a nearly landlocked sheet of water in a relatively warm region, possibly Rhode Island, but the site is very uncertain. Here they had ample opportunity for inspecting the wild men of the woods, first in trade and friendly intercourse afterward in the fury of hostilities. We learn: "They were swarthy men and ill-looking and the hair of their heads was ugly. They had great eyes and were broad of cheek." This is from Hauksbook. An almost identical version, copied later, in A. M. Ms 557, substitutes "small" for swarthy. The Flatey book narrative copied long after Hauksbook but perhaps before A. M. 557, and differing widely from both of them, lacks this descriptive passage, but says of the final affray: "There was one man among the Skrellings of large size and fine bearing, whom Karlsefni concluded must be their chief." Divers other details are given in the three versions, but they relate almost entirely to psychology, industries, equipments or other branches of anthropology not strictly physical. In a general way we may say that the wild men are presented as curious, suspicious, eager for traffic, emotional, readily passing from good temper into the extreme of fury. They were fur-hunters with inferior weapons, readily admiring and coveting the white men's bright-tinted fabrics and glistening arms; also skilled boatmen, swaying and brandishing their paddles in salutation. Perhaps they were Algonquian people, or some of their possible Indian predecessors of about the year 1004.

There is a gap in the records of the New World till the year 1347, when a small Greenland vessel visited Markland, returning by way of Iceland and Norway. They have left us no account of any Skrellings whom they may have seen.

A passage of Danish historical records for Greenland quoted by Thalbitzer relates that "two trolls, a young boy and his sister" were rescued from drowning by Skipper Bjorn Bonde, who spent several

seasons in Greenland after his arrival in 1385. They became greatly attached to him and killed themselves when he sailed away without them. No doubt they were Eskimo.

If we may give any credence to the very puzzling Zeno book and a subsidiary narrative which it embodies, a fisherman of the northern islands in the last quarter of the 14th century—perhaps about 1390—was shipwrecked on Estotiland (Newfoundland) and subsequently visited Drogio (Cape Breton Island) and many points much farther south, passing from tribe to tribe and making the acquaintance of many primitive people. Also we learn curious details of life in Greenland, when visited, not long after, by a northern Earl, whom this yarn had stimulated to explore abroad. But many parts of this book seem fabricated for a purpose or are recklessly unbelievable, and perhaps there is none of it which one could safely trust. Moreover, it is not strong on physical anthropology.

Certain fourteenth and fifteenth century maps throw a faint glimmering light on probable westward crossings of the Atlantic at various times and in different latitudes, the latest (also the most southerly) being from Cape Verde to Brazil not long before 1448. But none of those navigators brought back any reminder of the wild people that we know of unless we find it in an island name given by Beccaria's map of 1435 and by several successors. Among what he calls the "newly reported islands," of which Antillia (apparently Cuba) is the chief, we find one next northward, also next in area and similar though less in elongation, which he calls Salvagio, afterwards corrupted by Benincasa into Saluaga, by the Laon globe into Salirosa and by Andrea Bianco into Satanaxio. This name may mean no more than mere natural wildness, as seems the case with a cluster of rocky islets between Madeira and the Canaries, to which it is also applied; but again it may have been prompted by some experience of human savagery. Even so, it could tell us nothing helpful about the other characteristics of the inhabitants.

Probably very early explorers, as we know to be true of some later ones, were content to explore in a general way without the unaccustomed labor of elaborate writing. Moreover, they were more concerned to improve the maps for other seamen than to collect data for future anthropologists.

Fortunately, Christopher Columbus loved to write and had a liberal curiosity and varied interests. He has this to say of the Lucayans of the outer Bahamas, the first natives whom he discovered:

"It appears to me to be a race of people very poor in everything. They go as naked as when their mothers bore them and so do their women, though I did not see more than one young girl. All I saw were youths, none being more than thirty years of age. They are very well made, with very handsome bodies and very good countenances. Their hair is short and coarse, almost like the hair of a horse's tail. They wear the hair brought down to the eyebrows, except a few locks behind, which they wear long and never cut. They paint themselves black and they are the color of the Canarians, neither black nor white. They are all of fair stature and size with good faces and well made."

And the next day:

"As soon as dawn broke many of these people came to the beach, all youths, as I have said, and all of good stature, a very handsome people. Their hair is not curly but loose and coarse like horsehair. In all the forehead is broad, more so than in any other people I have hitherto seen. Their eyes are very beautiful and not small and themselves far from black but the color of the Canarians. Nor should anything else be expected, for this island [Guanahani] is in a line east and west from Hierro, in the Canaries. Their legs are very straight all in one line and no belly but very well formed. These people are very docile."

Later in this same voyage (his first) he relates intercourse with a chief of the Greater Antilles:

"This king and all the others go naked as their mother bore them, so do the women without any covering and these were the most beautiful men and women that had yet been met with. They are fairly white and if they were clothed and protected from the sun and air they would be almost as fair as people in Spain."

Dr. Chanca, who shared his second voyage, testifies to the courage of the Caribs of the lesser Antilles and adds:

"The difference between these Caribbees and the other Indians with respect to dress consists in their wearing their hair very long, while the latter have it clipped and paint their heads. All of them, both the Caribbees and the others, are beardless, so that it is a rare thing to find a man with a beard."

As quoted by Las Casas, Columbus stated that the natives of Paria, South America, were "of very handsome stature and all uniformly large" and whiter than any others he had seen in the Indies; and that yesterday he saw many as white as we are and with better hair and well cut and of very good speech.

Amerigo Vespucci (Americus Vespucius), as translated in Old South Leaflets, reports of his first Indians, somewhere on the mainland shore of the warmer part of America:

"They go entirely naked, the men as well as the women. They are of medium stature, very well proportioned; their flesh is of a color that merges into red like a lion's mane and I believe if they went clothed they would be as white as we; they have not any hair upon the body, except the hair of the head, which is long and black and especially in the women whom it renders handsome; in aspect they are not very good looking, because they have broad faces, so that they would seem Tartar-like; they are very light footed in walking or running; they swim beyond all belief. A woman thinks nothing of running a league or two, as many times we saw them do. A woman carried on her back for thirty or forty leagues a load that no man could bear."

There has been much discussion concerning his landfall, near which these people were found. The facts that they had "no seed of wheat or any other grain" and that no islands were passed in reaching this region, with other indications, seem to exclude any part of Central America. The northeastern corner of South America is more probable. It was in the year 1497.

John Cabot, that same season, touched and skirted North America in colder latitudes, but has left no description of any natives. Either he or some other navigator brought back to England not much later three skin-clad men, who soon learned to dress like Englishmen and then were hardly distinguishable as of a different race—at least by an observer who may have been rather negligent.

Gaspar Cortereal promptly emulated Cabot's exploit, starting from the Azores, and equally refrained from written description so far as we know. He carried instead to Lisbon fifty-seven human specimens. Two men of diplomacy, there before him, wrote down some account of these people or we should know nothing about them beyond their kidnapping. Alberto Cantino, the Venetian ambassador to Portugal, considered them "somewhat taller than the average among ourselves, with limbs in proportion and well formed. The hair of the men is long and they wear it in curls. They are shy and gentle and laugh 'considerably.'" Pietro Pasqualigo representing that zealous investigator Hercules d'Este, Duke of Ferrara at the Portuguese Court, wrote in a letter eleven days after the arrival of Cortereal's first caravel thus laden: "They are of like color, figure, stature and aspect and bear the greatest resemblance to the Gypsies. They are clothed with the skins of different animals, especially the otter. They are gentle and have a strong sense of shame and are better made in the arms, legs and shoulders than it is possible to describe." These letters are preserved in the monograph of Harris on *Les Corte-real*, etc. The bits of translation are from Biggar and Biddle respectively. Perhaps the

exiles may have been Beothuk or Nascopie. At any rate they were from that northeastern part of America.

According to Peter Martyr's seventh Decade, quoted by Harris in *The Discovery of North America*, a party of Spanish slave-hunters from Hispaniola (San Domingo), finding the Bahamas swept bare of human prey, in 1520 or thereabout pushed on northward to Chicora and neighboring regions, apparently of Carolina. There they inveigled many natives into their vessels and carried them away, being censured by other colonists for the act, but without punishment. Nor were these slaves returned to their homes. Castro, a jurist and priest, who presumably saw them, averred that "the women were dressed in lion's skins. The race has a white complexion." A corroborating witness differs a little in the latter detail for "It is said that the Chicorans are semi-brown like our husbandmen. The men let their hair, which is dark, grow until it falls to the waist. The women carry their hair, which is curled, longer. They have no beard."

De Ayllon, apparently in a distinct and subsequent voyage, visited this same locality.

"Having left Chicora, they went to another region where the inhabitants are said by De Allyn to have a white complexion, but Chicoran asserts that it is brown. Their hair is yellow and it comes to the heels. Their king is of gigantic stature."

But in these items it is plain that we are not quite dealing with first-hand testimony.

In 1524 there was another visitor, Verrazano, who wrote fluently, after exploring with zeal, like his fellow Italians Columbus and Vesputius. Some doubts have been cast on his journey of discovery, but they seem pretty well dissipated. He went forth under authority of the King of France and what purports to be his official narrative of the expedition addressed to this royal master is extant in two Italian manuscripts, which differ somewhat, the French original being lost. One of these copies was quaintly Englished by Hakluyt later in the sixteenth century; the other takes on a more modern guise in Old South Leaflets. Apparently he struck the Carolina shore, running across from Madeira. After some coasting, he had sight of the native people.

Here is the account of them in the Hakluyt version:

"These people are of color russet and not much unlike the Saracens, their hair is black, thick and not very long, which they tie up in a knot behind and wear it like a tail. They are well featured in their limbs, of mean stature and com-

monly somewhat bigger than we, broad chests, strong arms, their legs and other parts of their bodies well fashioned and they are disfigured in nothing saving that they have somewhat broad visages; and yet not all of them, for we saw many of them well favored, having black and great eyes, with a cheerful and steady look, not strong of body and yet sharp witted, nimble and great runners, as far as we could learn by experience; and in these two last qualities they are like to the people of the East part of the world and especially to them of the uttermost parts of China."

The other version relates:

"They go entirely naked, except about the loins they wear skins of small animals like martens fastened by a girdle of plaited grass, to which they tie all round the body the tails of other animals hanging down to their knees. The complexion of these people is black not much different from that of the Ethiopians, their hair is black and thick and not very long, it is worn tied back upon the head in the form of a little tail. In person they are of good proportions, of middle stature, a little above our own, broad across the breast, strong in the arms and well formed in the legs and other parts of the body, the only exception to their good looks is that they have broad faces, but not all, however, as we saw many that had sharp ones, with large black eyes and a fixed expression. They are not very strong of body, but acute in mind, active and swift of body, so far as we could judge by observation. In these last two particulars they resemble the people of the East especially those the most remote."

The differences in parallel passages are rather greater than the differing skill of translators will explain. If the translations were made from two distinct rough drafts we might find similar results. But the general drift is the same. In the comparison variously rendered as with the Ethiopians or the Saracens Verrazano may have had in mind in a general way the dark yet not negroid population of Northern Africa. Moors and some seaboard Berbers would probably be best known to him.

His experience with the Americans of that time did not end here. One of his men, stunned in an attempt to swim in through the breakers at a point not far to the northward, was revived and kindly treated by the Indians, whom he described in much the same terms as above. There was no immediate opportunity of repayment; but a hundred and fifty miles northward, perhaps along the Eastern Shore peninsula, Verrazano and his merry men did their best to carry away a human adult specimen, who was unwisely hiding from them instead of taking flight. She was "a young girl about eighteen or twenty, very beautiful and very tall," who dashed down their gifts in anger and shrieked so for help that they deemed it prudent to desist from taking her away. However they successfully kidnapped a small boy instead.

At New York Harbor he found Indians again, dressed in feathers and not very different from the others.

At Narragansett he was greeted by the finest looking tribe and the handsomest in their costumes that we have found in our voyage." Notably there were "two kings" clad in decorated buckskin and "more beautiful in form and stature than can possibly be described." These people in general

"exceed us in size and are of a very fair complexion; some of them incline more to a white and others to a tawny color; their faces are sharp, their hair long and black, upon the adorning of which they bestow great pains; their eyes are black and sharp, their expression mild and pleasant greatly resembling the antique. I say nothing to your Majesty of the other parts of the body, which are all in good proportion and such as belong to well-formed men. Their women are of the same form and beauty, very graceful, of fine countenances and pleasing appearance in manners and modesty. They wear no clothing except a deer skin ornamented like those worn by the men."

He describes also elaborately their decorations of the head and arms.

Coasting northward he had some unpleasant experiences with "rude and barbarous" natives, apparently of the upper New England shore beyond the range of regular cultivation of maize, or "pulse" as he terms it. These people were hunters and fishers, clothing themselves in "the skins of bears, lynxes, seals and other animals." We learn nothing more about them, nor of others beyond them.

There is general agreement among these accounts of the American sea shore prior to 1525. Indians on the Atlantic side were shapely and active, not usually smaller than the Europeans of their time, especially those of southern Europe. In the warmest latitudes there was a conspicuous lapse toward nudity—"naked as their mothers bore them" is a curiously repeated testimony; but costume grows as we go northward as shown by the dangling aprons of Carolina, the ornamental buckskins of Rhode Island, the bear skins and seal skins of the northeast and the skin kirtles—whatever that may stand for—of the Eskimo. Tribal differences appear in the docility of the Lucayans, the fierceness of the Caribs, the capricious inconstancy of the Algonquians about Hop and the surly hostility of Verrazano's Maine Indians; also, the very great endurance of the feminine burden bearers in the most southerly region reported on, contrasting with the reports of some inferiority in sheer strength among the Carolinians, though coupled with abundant activity. Even in tint we are made to note distinctions, certain tropical communities being so light of complexion that both Columbus and

Vespucci insist that if shielded from sun and weather they would probably be as white as the Mediterranean peoples. The Norse saga agrees with Vespucci and Verrazano (at Carolina) in seeing their faces often broad and unattractive. The last named doubtless hits the exact truth when he distinguishes the two kinds of Indian faces, the broad and aquiline, which may still easily be identified. No race is altogether homogeneous. This bit of careful observation and conscientious record incidentally refers to "large black eyes" with "fixed expression." Columbus also mentions eyes which are "not small" but very "beautiful" and Karlsefni's narrator declares "they had great eyes." This seems a rather striking agreement on an Indian feature which has given rise to some discussion. Perhaps their eyes were always pretty certain to arrest the attention of more civilized men, whether by size, intensity or wildness; and a certain sense of prominence and amplitude would remain.

The matter of color, as always, claimed first attention and with the general aspect provoked comparisons, derived necessarily from the comparer's experience. One witness calls them in some instances "white" but with the qualification that they need certain treatment to bring it out; another writer swarthy; another says "a color that merges with red like a lion's skin." Columbus declares they "are the color of the Canarians neither black nor white." This comparison, shortly afterward repeated, is almost startling, in view of the fact that his own transatlantic voyage, then in progress, had lain straight across from the Canaries to the West Indies, proving the feasibility of that route; but the indication loses force when we recall Vespucci's comparison to the Tartars, Pesqualigo's to the Gypsies and Verrazano's to the Saracens or Ethiopians and the peoples of the farthest east. In that last utterance, he presents us with one of his lucky hits or flashes of insight. Possibly he had seen specimens somewhat like the Gilyak, representing what has been called the American type in Siberian population. The fact is that each writer did his best to convey an impression or idea and naturally used what he knew to show more vividly what he had found. The Norsemen knew little of real wild men and whatever seemed uncouth to them summoned trolls, giants or unipeds from their store of superstition or provoked a contemptuous and inimical term like Skrelling, which still had often some connotation of magic. Pesqualigo probably knew gypsies better than other dwellers of the open air and thought of them promptly. The three great sailors drew from stores of wider personal observation. Not one of them exactly hit the mark, unless it were Verrazano in his second suggestion.

Taking the reports collectively, the general impression is of notable homogeneity, notwithstanding the local and tribal differences noted, and allowing for the two main types of Indians (broad faced and keen faced) already mentioned. This is true in a higher degree than can be said of some later observers, possibly because our instances herein given are rather few, but possibly, also, because the subsequent reports were often the result of less unsophisticated minds, dealing with modified material.

It is scarcely necessary to add that there seems nothing at all in the data given to indicate a transfer of red-skinned population at any time across the Atlantic.

THE ORIGINS OF THE ITALIAN PEOPLE

V. GIUFFRIDA-RUGGERI

Professor of Anthropology, University of Naples, Italy

In dealing with the problem of origins of what now are the Italian people, it will be necessary to leave aside all that relates to the paleolithic age, as Italy appears to be much less favoured in such remains than other regions of western and southern Europe. A much more solid and rich ground is encountered in the neolithic epoch. From the Lombard plains to the Ionic shore of Italy archeologists have found repeatedly circular foundations of huts half buried in the earth, representing the remains of dwellings of a neolithic pastoral people. The huts were hollowed in the ground on purpose, perhaps to afford better shelter from the wind, or from enemies, and they were entered either by means of steps, or inclined plane, or a shaft made close to the hut. In the hollows that remain are found weapons of polished stone, and various remains of domestic handieraft, including pottery of advanced technique, form and decoration.

These *hut-dwellers* practiced inhumation of their dead. The body was buried in the so-called "contracted" position (with the legs doubled up), and generally lying on its side. With the body was placed everything the being was supposed to need in his or her life beyond the tomb. Skeletons from such burials may be seen in the great Prehistoric Museum in Rome, founded and still directed by Prof. Luigi Pigorini; some are still partly enveloped in the earth in which they lay, and are accompanied by the various articles that were buried with them.

Where caves existed, they were utilized for burials by the small neighbouring population. Many such caves have been explored, especially in Liguria. It is here that are located the famous Balzi Rossi (in dialect "Bausse russe") caves, also called the caves of Mentone, which have yielded so much valuable material. These particular caves are on the frontier between Italy and France and close to the territory of the Prince of Monaco, who contributed liberally for their exploration by French archeologists. They were inhabited and used as

burial places from the end of the palaeolithic age, to which (Cave I) belong the skeletons of negroid type, which were found there along with others, more recent, of the Cro-Magnon type, and similar to those of the Magdalenian epoch in France. The caves, therefore, seem to belong in one sense to the French paleoanthropology and in others to the Italian. Their implements have been attributed to the end of the Aurignacian epoch, but the caves are also related to the earlier neolithic caves of Liguria, examined by Professor Issel and other Italians, from which numerous skeletons have been secured which are now deposited in the Geological Museum at Genoa.

Other old tombs are found excavated in cliffs. These are characteristically Italian, and Pigorini calls them "the most ancient monuments of the European continent." These artificial caves, which were entered by an inclined plane, by a cylindrical shaft, or by steps cut in the rock, are shaped like a narrow oven and in reality reproduce in measure the semisubterranean type of the dwellings mentioned above.

The first Italian scholar to demonstrate the importance of the study of these prehistoric remains, was Gaetano Chierici; and he was followed by a large number of students whose work threw much light on the whole Italian neolithic age and the origins of the Italian people. From the results obtained, it seems certain that there was no continuous line of population. Pigorini, who has devoted his life to these researches, holds that, although the old inhabitants may have remained undisturbed here and there, there was a time when in their midst appeared suddenly a new people, whose usages, customs, arts and crafts were of a totally distinct nature.

These new inhabitants probably came originally from the East, in canoes, and having crossed the Mediterranean landed on the Southern shores of the peninsula, as well as in Sicily and Sardinia. They left, in the huts and caves, among ornaments and other articles, the shells of *Meleagrina margaritifera* and *Mitra oleacea*, which point to the Eastern route. Eric Peet in his comprehensive volume *The Stone and Bronze Ages in Italy and Sicily*,¹ writes of these invaders:

"They are no novices in the art of pottery-making, for they have discovered that the clay fires better if mixed with small grains of sand or gravel, and they produce forms which are far from rudimentary."

He also adds that they were a pastoral people and could in fact be no other than those who later came to be called *Ligures* (Liguri) by the

¹ Oxford, 1909.

historians. He is uncertain, however, whether the Ligures came by sea, or directly by land, passing through Spain and Southern France. This latter route, if they originated as presumed from the East, would certainly be much longer, as it would mean that they had to cross all Northern Africa to the Straits of Gibraltar and then to Italy; but it was perhaps the route most likely to be followed by a pastoral people.

The *Siculi* belonged evidently to the same race as the Liguri, and physically they were both people of the mediterranean type. The descent of the Siculi from the Italian peninsula to Sicily is strenuously upheld by Giovanni Patroni,² and seems to be confirmed by various archeological evidence. That they were once on the mainland in the vicinity of the island is certain. Even in Thucydides times, there were Siculi in Calabria, and tradition mentions them in other parts of the peninsula. But the most ancient neolithic population of Sicily, that which takes its name from Stentinello, a locality near Syracuse, must have come straight from the Eastern Mediterranean, probably from Crete, if Peet is right in his assertion that the neolithic Stentinello pottery, to be found in the museums of Syracuse and Candia, belongs to the same type as that which came from beneath the floors of the palace at Knossos and elsewhere in Crete.

At a later epoch, at the end of the neolithic age, there are also found, in the cave of Villafrati near Palermo, Sicily, human remains with markedly brachycephalic skulls, which did not belong to the Mediterranean race. Their ethnic identity is as yet uncertain.

The legend of the "*Sicani-Iberi*" invaders of Sicily is now put aside. Similarities in the Western part of Sicily to Iberian civilization are not lacking, but this is probably due, according to Peet, to "that great wave of influence which touched the coast districts of Western Europe, bringing with it the dolmen and dolmen-pottery," rather than to actual, large immigration.

As to Sardinia, Patroni affirms that besides the most ancient oven-formed tombs on that island, the so-called "*domus de janas*" or "witches houses" (*case delle streghe*), one finds also numerous remains of the dolmen civilization. The whole evolution of the dolmen is here encountered, from the small dolmen which is only slightly raised above the level of the ground, to the highest form, and from that constructed of a very few slabs of stone to that made of many stones, gradually

² Patroni (G.), *La civilisation primitive dans la Sicile Orientale. L'Anthropologie*, 1891, 129, 294.

lengthening until it assumes the form of those corridors of tombs called "tombe di giganti."

The evolution in Sardinia of the "domus de janas" reached its highest development about 2000-1500 B. C., as seen in the little caves of Anghelu Ruju near Alghero, explored by Antonio Taramelli. These burials belong to what is called the "eneolithic" age, that is to an age in which copper was used as well as stone—we are here at the beginning of the employment of metals. In these caves also are buried the representatives of the migration which came from the East,³ and this time the proofs are not simply shells but also pottery which is identical with that of Crete, symbols in relief on the walls and pillars of the tombs, marble figurines of an asexual and also of a feminine type like those so well known from the Egean, traces of the betylic cult, and the statue of a bull-god. As to the skeletons found in the necropolis of Anghelu Ruju, of 63 skulls studied by Sergi 10 (16 per cent) were found to be brachycephalic and belonged probably to "Eurasians."

Another indication of the Eastern source of this eneolithic people, who were known to the Egyptians of the XIXth dynasty as the *Shardana* ("Sards"), is found in the megalithic architecture, known as Cyclopic constructions, introduced by them especially in the construction of the "nuraghi." These massive buildings were the fortresses of the epoch, had an evolution of many centuries, and became gradually more complicated and sumptuous as the metal age advanced. They were preceded by stone huts, resembling the conical brick structures which are found pictured in the assiro-babylonian bas-reliefs. Patroni has lately insisted on this analogy, pointing also to the huts of Orcomeno, in prehistoric Greece, which had a base of stone and domed roof of raw bricks. In the Eastern Mediterranean the raw brick rapidly gave place to stone.⁴

During this period Sardinia seems to have risen to importance and power which it did not equal in later times. Bronze was manufactured here on a large scale and exported. The cupriferous rocks in which the island was rich, were diligently sought for by the Sardinians in trenches, galleries and wells, as shown by Taramelli, Director of the National Museum at Cagliari; and remains of tin mineral in the form of cassiterite, found by the same explorer, show importation of ma-

³ Giuffrida-Ruggeri (V.), *Antropologia e archeologia in taluni riguardi della preistoria europea. Arch. per l'Anthrop. e l'Etnol.*, XLVI, 1916, 1-2.

⁴ Patroni (G.), *L'origine del "nuraghe" sardo e le relazioni della Sardegna con l'Oriente. Atene e Roma*, 1916, XIX, 211-213.

terials necessary for the bronze manufacture.⁵ It has been supposed by Bates that the Sardinians provided war material for the confederation of the "peoples of the sea" who attacked Egypt in the XIIth century B. C. They took part in this attack with valour such as their descendants have recently shown in the battles on the Isonzo. The student who wishes to get an adequate idea of this people who enter history before Rome was founded, should visit the Museum at Cagliari, as well as the island itself, descend into vaults excavated by stone axes, climb on to the nuragic ramparts, and by the winding staircase which twists in the thickness of the wall of the *nuraghe* itself, reach the superstructure. An entire acropolis of theirs has been discovered by Taramelli, and its remains of many sacred buildings show that it must have been held in veneration by all the inhabitants. There are evidences of foresight against enemies, piety for the dead, and mystery in the temples, where strange rites took place in relation to subterranean water.

From the disposition of the *nuraghi*, it is plain that the enemies of these eneolithic Sardinians came from the sea, as could of course hardly be otherwise. They may have been the pirates of the period.

Racially the Sardinians were essentially Mediterraneans. They were visited by the Phoenicians, who left traces of their banal commercial civilization but probably no important admixture; and were subjugated eventually by the Carthaginians, only a few tribes who fled to the mountains retaining their independence. Then times became ever less favourable, and eventually there came the hard struggle against Rome who deported many tens of thousands of the Sards as slaves and left the rest in subjection.

The Siculi also took part in the great raid against Egypt, but that was not the period of their greatest power. The excavations made by Paolo Orsi, the director of the fine National Museum at Syracuse, have certainly shown us the neolithic age, Mycenaean and Egean influences, villages and cemeteries, anterior to the coming of the Greeks, but it was only with the advent of these latter that Sicily took the foremost place in the Western Mediterranean. The power and beauty of the two great rivals—Agrigentum and Syracuse—still fascinate the historian and the lover of beauty. That which remains makes one regret that which was: such evidences are closer to us than those of Sardinia and are a part of our direct intellectual inheritance.

⁵ Taramelli (A.), I problemi archeologici della Sardegna primitiva. *Riv. di Antrop.*, 1916, xx.

Leaving the islands and returning to the peninsula, we find a few as yet not clearly classified dolmens and menhirs in the "Terra d'Otranto," other dolmens near Bari, and here and there so-called Cyclopean buildings over which we need not linger. Of more importance are the dwellings built on pile-structures, which, at the end of the neolithic age and the beginning of the age of metals, appear in the lower valley of the Po, forming, according to Pigorini, "perhaps the most important monuments of the pure bronze age in all Europe." These are the so-called "terramare." As Pigorini himself is the foremost investigator of the *terramare-dwellers*, we will follow his "The most ancient civilization in Italy," read at the meeting of the R. Accademia dei Lincei, on June 7, 1903:

"Whilst the civilisation of the dolmen and megalithic monuments flourished in Western Europe and in the Mediterranean, there was a different civilisation in Central Europe. Here we find a people who lived in the lake-regions on pile-structures (*palafittes*), a people whose history is written only in the refuse of their daily life, covered today by water and peat-bogs."

This refuse shows us a primitive pottery, the cultivation of flax and grain, and pastoral life.

Some of these lake-dwellers descended into Lombardy and occupied the ponds and lakes of that region. Later their kindred from the valley of the Danube penetrated into Venetia, along the valley of the Adige; when they reached the Po they crossed it and invaded Emilia as far as the sub-Appennine hills. The organisation of these groups appears very rigid, almost inflexible, judging from the fact that wherever they settled to construct their stations they religiously erected a pile-dwelling, even though the spot was elevated and unadapted for such a construction. This is shown by divers pile-dwellings situated on hills. There are little towns with streets and houses all built on wooden posts.

According to Pigorini, who excavated many of these *terramare*, they are always quadrilateral, of trapezoid shape; and the general arrangement of the little towns is identical with that which we find later in "Roma quadrata," the city of Romulus. Moreover, the objects characteristic of the *terramare-dwellers* have been found in regions nearest the Urbs, that is in Sabine and in Marsica. On these resemblances depends the great importance of the *terramare* culture, which was the mother of the civilisation of Latium.

The dead of the *terramare* people were cremated, the few bones remaining among the ashes being collected in rude ossuaries which were

left uncovered. Sometimes these ossuaries have been found in a simulacrum of a pile-dwelling, fashioned like a terramare with its surrounding moat and wooden bridge at each side.

Towards the ends of the second millennium B. C., a great movement of peoples into Italy takes place from the north, and the pile-dwellings of eastern Lombardy, with those of western Emilia, are abandoned by their inhabitants. These had certainly been driven away, while, on the other hand, the Ligures stayed in the western region of the Po valley until the time of the Gallic invasion, while the *Euganei* whose splendid necropolis is found at Este near Padua settled in the eastern region. Basil Modestov, a Russian, who made Italy the subject of intensive research, enables us to give a solution to many problems of the early history of Italy. In his learned volume "*Introductions a l'histoire romaine*"⁶ he shows that the invaders of the terramare region descended from the Rhaetic Alps, and were those who were afterwards known to Greek historians as *Umbrians*—the oldest historical inhabitants of northern and central Italy. They were in the first iron age, which corresponds to the so-called "civilisation of Villanova," a famous necropolis about 8 km. from Bologna.

The dwellers in the terramare who were driven from their homes, descended southward, towards the Marche and the Tiber valley, and it seems that some reached the shores of the Ionic sea; but they did not reach Sicily or Sardinia. If really, as everything leads us to believe, their descendants were the Latins, the founders of Rome, it is necessary to say that their penury of cultural gifts was perhaps compensated by a quality for organization, a spirit of discipline and frugality in their lives, qualities which we find in the ancient Romans.

The Umbrians also practiced cremation of their corpses. The *Osci*, the *Sabines*, the *Samnites* and other Sabellic peoples, inhumed their dead. It is possible that the founders of Rome consisted of both groups, as we find in ancient Rome both these modes of burial.

In the Anthropological Museum of the University of Rome are kept 28 Roman skulls all anterior to or contemporaneous with the walls of Servius Tullius. The greater part came from the burial ground on the Esquiline. These skulls give an idea of a part of the population. This is seen to have been prevalently made up of the mediterranean type, with skulls more or less dolichocephalic, a rather long face and a nose of medium proportions (mesorhine). The population who cre-

⁶ Paris, 1907.

mated their dead, however, was probably not of the mediterranean type; it may have been made up mainly of representatives of *H. alpinus*. These hypotheses are difficult to confirm, as may also be said of the opinion of Sergi that the "Aryans" were all brachycephals from Asia.

Among the Italic peoples, with the Latins, Umbrians and others, we have not yet mentioned the *Etruscans*. This in spite of the fact that Rome was founded *etrusco ritu*, that the urns shaped like huts or houses are found both in Latium and in ancient Etruria, and in spite of other circumstances, such as that the Etruscans were the masters of the Romans even in the art of building. The reason is that opinions about the Etruscans are divided. There are those who believe with Pigorini that the Etruscan civilisation was no other than a more developed state of the terramare civilisation of Emilia, so that the Etruscans would be the pile-dwellers of the northern Italian lakes who came down from Rhaetia under the name of Raseni. Others hold with Professor Milani, that the Etruscans came from Lydia, bringing to Italy a civilisation characteristic of Asia Minor. The ancestors of the Etruscans apparently passed the Apennines, conquered Emilia, and at about the end of the VIth century B.C. came in contact with the Rhaetians, a celtic population from the Alps, from which grew the tradition of the Etruscan origin of the Rhaetians. The fact is that whilst on the Emilia side of the Apennines the form of burials remains unchanged, the use of tumulus burials and architectonic tombs with rich furnishings of precious metals, bronze and terracottas of one or more colours and with sculptures in stone, is diffused in Etruria. The Etruscan vaults show the astonished visitor a truly oriental luxury. The symbols there found are also oriental, neither the alphabet nor the writing seeming to be of Italic origin. All this is accompanied by a perfection in the technique of extracting and working iron and of hammering out bronze, by a splendour of filigree jewels and by the perfection of the culture of vines and grain. The Etruscan remains in the museums of Rome, Florence, Volterra, Arezzo, Bologna, and other cities inspire the highest opinion of these gifted people, worthy forefathers of the great Tuscans who gave to the Italian Renaissance such a splendour of art. The skulls taken from Etruscan tombs are numerous and in great majority dolicho-mesaticephalic, that is of the oblong mediterranean type; the remainder, of the Alpine or "Eurasian" type, are attributed to the Umbrians existing in the region before the coming of the Etruscans, though even the Umbrians were not all brachycephals. This mixture of dolichocephals and brachycephals in central Italy has always been maintained and indicates the mixed nature of the population.

The question as to who were the "*Italici*," seems to us, after the preceding, quite superfluous, for there were no special people of that name. Neither the Etruscans nor the Umbrians were really the most ancient inhabitants of the country; and the term Italy appears for the first time much later, in a little corner of Calabria.

Italy is a historic formation and all the races that contributed to her making are equally "Italian." But this applies especially to the various ancestors of the people anterior to the foundation of Rome, exclusive perhaps of the Etruscans, who were of such a distinct nationality that even in a very late epoch the fact was recognized by all cultivated people and Seneca wrote *Tuscos Asia sibi vindicat*. In old Etrucia everything spoke of and connected with the east. Thus the habits of the Etruscan women were quite the reverse of the reserved habits of the Italic women as shown by the ancient Romans. As girls, like the Lidian girls, they were more eager to accumulate a dowry than to keep chaste, and as wives they rioted at the banquets seated beside their husbands. The children took their mother's name instead of their father's, a sign of the matriarchate. Under the levelling hand of Rome, and by mixture with other peoples, these Asiatics however became also *Italici*.

According to our present knowledge, it was at the time of the great mediterranean invasions (XIII-XIIth century B. C.)—in that ethnic turmoil of the so-called "peoples of the sea" who sought other lands, pressed from their homes by the Aryan vanguards which came from the North—that the "Tursha" or Etrusci reached and attacked Egypt on their way from their abode in Asia Minor. They came to the Nile Delta with their women and children, and were evidently looking for land to colonise, but "were thrown into the sea" (abt. 1260 B. C.) by the armies of Merenptah, and again by Ramses II (c. 1190 B. C.), as we read in the inscriptions of Medinet-Habu. These failures must have diverted them in another direction, towards the barbaric regions of the West. So it was that about the XIth century B. C.—as Montelius believes and as Arthur Evans and other authoritative archeologists allow—their boats reached the western peninsula, the fabled Hesperia. They occupied Tuscany, and we still see there a physical type which is not common to the rest of Italy, a long, thin face with somewhat wide cheek-bones, especially to be seen among the women, and other distinctive features.

The population of Rome, the "eternal city," was composite. It embraced from early times probably representatives of all the three main

racces of Europe, the *H. mediterraneus*, *H. alpinus*, and even the *H. nordicus*. The skeletal remains of the Mediterraneans and the Northeners are difficult to be distinguished from each other; but it is safe to assume that the mediterranean race formed always the predominant strain of the population.

The more historic invasions of Italy, which resulted only in localized changes in the population, are too well known to be here considered. Anthropological investigations on the contemporaneous Italian population, show no uniformity, no definite "Latin race." The student finds that the physical characteristics of the Italian people are varied from region to region and in cases even in the same localities. And he has no criterium by which to select some as the true representatives of the "race" and leave others aside. There exist instead a number of somatic groups or units. From the investigations in military anthropometry which Livi⁷ has coördinated and summed up, we can say nevertheless that there is a very evident somatic difference between the north and the south of Italy. The collections of skulls which have been studied of these two large regions have shown that the lower half of the peninsula and the islands have today a relatively homogeneous population. The fact of finding practically only certain cranial forms in this region, namely ellipsoid, ovoid, and pentagonoid, along with orthognatism and a lepto-mesorhinc nasal index, gives us the right to think that we are dealing here with a real ethnic variety, the Mediterranean race, without wishing to enter into the question whether this has not been originally altered by more archaic forms, which may have belonged to another race less orthognate and less leptorhinc;⁸ and without wishing to exclude the possibility that another racial element, which can only be diagnosed by its characteristics of very high stature and loss of pigmentation, has become incorporated into the Mediterraneans. Vice versa the collections from the north show the opposite fact, that is a prevalence of skulls of forms short, sphenoid, spheroid, etc., and especially platycephalic, which are the shapes generally associated with the so-called Eurasic stock, or better, perhaps, the Alpine variety. But the homogeneity here is less than in the south, as mediterranean forms are also fairly well represented.

⁷ Livi (R.), *Antropometria militare*. Parte I, Roma, 1896; parte II, Roma, 1905.

⁸ Cfr. Giuffrida-Ruggeri (V.), Quattro crani preistorici dell'Italia meridionale (Romanelli, Vitigliano, Arpino, e Fucino), e l'origine dei Mediterranei. *Arch. per l'Antrop. e l'Etnol.*, 1915, XLV, 3-4.

The same facts appear in the maps of the cephalic index of the living published by Livi: we see in southern and insular Italy a great prevalence of dolicho-mesaticephals, in northern Italy the preponderance of brachycephals, whilst in central Italy, the brachycephals prevail on the Adriatic slope, the dolicho-mesaticephals on the Tyrrhenian slope. In the North also there is not everywhere the same intensity of brachycephals, there being lighter spots which correspond to a considerable proportion of dolicho-mesaticephals; and we may recall that part of the Mediterranean skulls, especially the pentagonoid and ovoid shapes, pass into the first degree of brachycephaly. In certain Emilian and Lombard provinces the Alpine cranial forms are less than half of the total. In Southern Italy there are here and there unequal brachycephalic infiltrations, according to where new ethnic elements have been carried by various invasions. It seems, however, that such influences have quite spared the Garfagnana and in part also Liguria, especially about the gulf of Spezia where the ancient dolicho-mesaticephalic, brown, tall population has remained almost intact.

Nicolucci⁹ says that in Romagna one not infrequently meets men of a strong robust figure, perhaps descendants of the Langobards. These men of northern origin have generally a high nose, somewhat thick towards the tip, and rather prominent cheek-bones; they are tall, of a white skin, with light brown hair ranging to blond. He also quotes Maggiorani, who says that descendants of the Arabs are recognisable in Sicily by their rather tall, slim, slight figure, brown coloring, long profile, deep-sunk, black, shining eyes, small mouth, and aquiline nose with only slight depression at the root. But these elements are of no great numerical importance.

In its colouring of skin and hair the present Italian population is by a very great majority dark, and this applies not only to the descendants of the Mediterranean race but also to those of the so-called Celtic strain, which predominates in the valley of the Po. The largest proportion of really blond individuals, with blond hair, and light eyes, is encountered in Venetia, together with a rise in stature. In a minor degree, however, blonds or approaches to blonds are found all over Italy, not excluding the islands. In Sicily they are specially found in the province of Palermo, which is accounted for by the number of Normans who established themselves there in the Middle Ages.

⁹ Nicolucci (G.), *Antropologia dell'Italia nell'èvo antico e nel moderno. Atti R. Accad. sc. fis. mat.*, II, serie 2, Napoli, 1888.

The Albanians, who settled in Italy when the Turks conquered their country, from investigations in the province of Cosenza¹⁰ are found to be less pigmented than the Calabrians; they are also taller and less dolichocephalic.

Further anthropological researches are needed to elucidate with greater definitiveness many phases in the origins of the Italian population. But as here shown, enough evidence is already in our possession to make the fact clear that the Italian people, as all other larger Latin or non-Latin nations of Europe, are of a mixed composition.

¹⁰ Zampa (R.), *Anthropologie Illyrienne. Revue d'Anthrop.*, 1886, 3e sér., 1, 625-647. Unfortunately this important paper is full of printer's errors; cfr. by the same author, *Vergleichende anthropologische Ethnologie von Apulien, Zeitsch. f. Ethnol.*, 1886.

RELATION OF THE EXTERNAL NOSE TO THE BONY NOSE AND NASAL CARTILAGES IN WHITES AND NEGROES

ADOLF H. SCHULTZ

Carnegie Institution of Washington

The form of the nose is generally considered to be of great anthropological importance, and the nasal index, with its great racial differences, is regarded by many authors (Broca, 1872, Collignon, 1887, Risley, 1891, and others) as one of the best, if not the most distinctive racial characteristic. External and skeletal nasal measurements have been undertaken on countless material, but knowledge of their interrelations is limited to a few investigations (Charles, 1894), and scattered remarks in the literature. The study of the nasal cartilages from an anthropological standpoint has been undertaken only by Hovorka (1893) and H. Virchow (1912 and 1913) on small series of material. In the present contribution the author has based his study upon 36 human heads: i.e., 8 adult whites, among them 1 woman; 23 adult American negroes, including 3 women; and 5 American negro children ranging in age from 2 to 4 years. He wishes to express thanks to Dr. W. H. Lewis, from the Anatomical Department of the Johns Hopkins Medical School, for his permission to utilize this material.

In each case measurements were taken of the nasal height (nasion to subnasal point) and the greatest breadth across the alae; then an exact drawing was made of the profile of the nose, including the wing, by means of the dioptograph of Martin, after which the right half of the nose was dissected. The nasal skeleton and cartilages were outlined in profile drawing; but a number of direct measurements of these structures were also made with the aid of a compass for control.

RELATION OF THE EXTERNAL NOSE TO THE BONY NOSE

The height of the external nose—that is, the distance between the nasal and subnasal point—corresponds to the nasion-subspinal point measurement of the skull. The subspinal and subnasal points do not, however, lie at the same level. There is a difference in the two measurements which in the adult whites amounts on the average to 1.4

mm., and in adult negroes to 1.6, in favor of the external nose. The maximum difference in an adult was 8 mm., and in only two cases was the subspinal point somewhat below the subnasal point. In the negro children the subnasal point was situated on an average 0.4 mm. below the subspinal point. In 10 whites and 20 negro fetuses and children, ranging from the eighth month of pregnancy to the second month of post-natal life, upon which the author had previously made measurements of the external head and the fresh skull, the skeletal nasal height

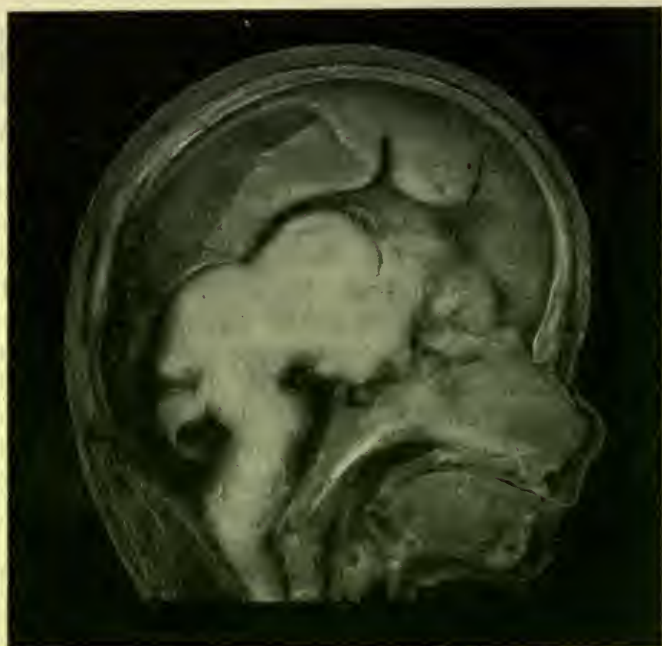


FIG. 1.—Median sagittal section through the head of a white fetus of 13 weeks.

in the whites was on the average 0.5 mm., and in the negro 0.45 mm. greater than the corresponding height of the nose before the bones were exposed. At birth, therefore, in contrast to the adult condition, the subspinal point lies below the subnasal point. It is evident from figure 1 that in early development the subspinal point is situated at even a greater distance below. In fetuses and the newborn, therefore, the physiognomic nasal height is less than the corresponding skull measurement, while in adults it is greater. This leads to the conclu-

sion that in the beginning the soft parts of the nose grow more slowly than the underlying bony structure, but overtake the latter during childhood. This explains the fact that in the fetus and newborn the nostrils are situated above the floor of the nasal cavity, while in the adult they lie below it.

The breadth of the nose itself is always greater than the breadth of the *apertura piriformis*. The average difference in the adult whites was found to be 9.9 mm.; in adult negroes, 14.9 mm.; and in negro children between 2 and 4 years, 11.2 mm. In the above mentioned 30 specimens from the eighth month of intra-uterine life to the second month of postnatal life, it averaged 6.9 mm. in the whites and 8.95 mm. in the negroes. H. Virchow (1912) found the difference to be as follows: In 2 negroes from Kamerun, 8 and 17 mm. respectively; in 2 Chinese, 14 and 16.7 mm. respectively; in a female Indian, 13.5 mm., and in 3 Sunda Islanders 13, 16 and 17.7 mm. respectively. The difference appears therefore to be least in the white race.

In order to compare more carefully racial as well as age differences, an index was introduced which expresses the breadth of the aperture in percentages of the breadth of the nose:

$$\frac{\text{Breadth of aperture}}{\text{Breadth of nose}} \times 100$$

In the following table the averages of this index are given for the different races. From this it is plain that the width of the aperture approaches the nasal breadth most closely in the white race. The great difference noted between the nasal breadth of the white and that of the negro race, both in newborn and adult, does not appear to exist to the same degree as regards the width of the aperture. The table shows, moreover, that in both whites and negroes the index increases

RACE	AGE	NUMBER OF INDIVIDUALS	INDEX
Whites.....	Newborn	10	60.2
	Adult	8	72.7
Negroes.....	Newborn	20	56.7
	2-4 years	5	61.6
	Adult	23	65.3
Chinese (Virchow).....	Adult	2	61.5
Sunda Islanders (Virchow).....	Adult	3	63.7
Indian (Virchow).....	Adult	1	64.5
Negroes (Virchow).....	Adult	2	68.9

during the course of growth; i.e., the breadth of the aperture increases at a greater rate than the nasal breadth. This relation between the two nasal breadth measurements is the inverse of that between the two nasal height measurements, where the bony structure showed less tendency toward growth than the soft parts. This explains why the height-breadth index of the external nose diminishes more than the corresponding index of the skull during the progress of growth.

The relation of the width of the aperture to the nasal breadth, may vary markedly in individual cases, as illustrated by the curves in figure 2. The extremes of difference between the two measurements were found to be 4 mm. in an adult white, and 22 mm. in an adult negro. From the wide variation in the aperture-nose-breadth index,

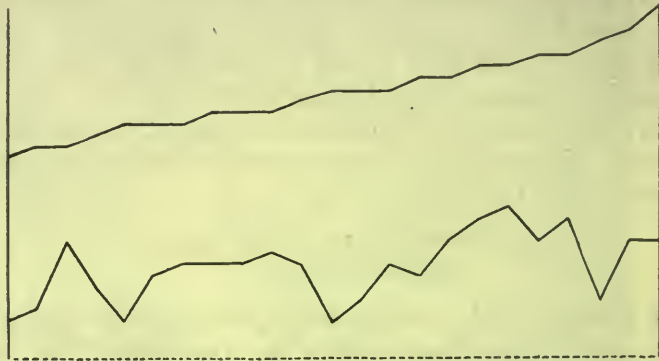


FIG. 2.—Curves of the nasal breadths and corresponding breadths of the aperture in adult negroes. Arranged in order of increase of nasal breadth (upper curve).

which in adult whites lies between 59 and 87.1, in adult negroes between 53.2 and 78.9, in newborn whites between 50 and 68.4, and in newborn negroes between 42.9 and 73.7, it is evident that no conclusions concerning the breadth of the external nose can be drawn from the breadth of the aperture. In other words, there is scarcely any correlation between the two breadths.

It is often very difficult to determine exactly the location of the nasion on the face, inasmuch as the nasofrontal suture rarely forms a palpable furrow, and there is not always an angle between the nasal bones and the frontal bone. Frequently, however, there is a concavity in the upper part of the nasalia, and then the deepest depression on the bridge of the nose lies below the nasion. For the purpose of

orientation the height of the nasion on the face above a line between the two medial palpebral commissures was measured. The average for both whites and negroes was found to be 16 mm. In some races the nasion may be situated much lower. In the Veddahs, for instance, it is said to be frequently located as low as the middle of the orbital height (Sarasin). The thickness of the soft parts over the nasion was found to be on an average 4.9 mm. in adult whites, and 5.6 mm. in adult negroes. This measurement was made by Kollmann and Büchly (1898) on 21 Europeans, the average obtained being 4.3 mm. Hovorka (1893) found in 30 Europeans that it varied from 2 to 5 mm., and Birkner (1906) obtained in 6 Chinese an average of 6.6 mm. The thickness of the skin is least, as a rule, over the apex of the nose.

The profile line of the external nose rarely runs parallel to that of the nasal bones. This is due in part to the interposition of the procerus muscle, the latter in general being more strongly developed in the negro. The subnasal point is, on an average, in whites 6.4 mm., and in negroes 7.3 mm. distant from the lower border of the nasal septum. This constitutes the height measurement of the *septum membranaceum mobile* (also called *septum narium membranaceum*). Finally it might be mentioned that the posterior border of the *ala nasi* is situated always anterior to the lateral border of the *apertura piriformis*.

NASAL CARTILAGES

In some of the specimens the upper part of the anterior edge of the *cartilago septi nasi* continues in approximately the same direction as the nasalia. Not uncommonly, however, the two form an obtuse angle, pointed anteriorly. This is the case not only in the convex, but may occur also in the straight or concave nose. Differences between the two races were noted in the portion of the *cartilago septi nasi* situated below the lateral nasal cartilages. In whites the anterior edge of the nasal septum follows the same direction for some distance beyond the point where it meets the lower borders of the lateral nasal cartilages; whereas in negroes it bends backward at this point. A similar difference exists in the lower border of the septum. In whites this projects horizontally from the nasal spine, while in the negro it bends upward immediately in front of the spine, extending in a shallow arc, or even in a straight line, toward the anterior inferior angle of the lateral nasal cartilages (fig. 3).

A.5.

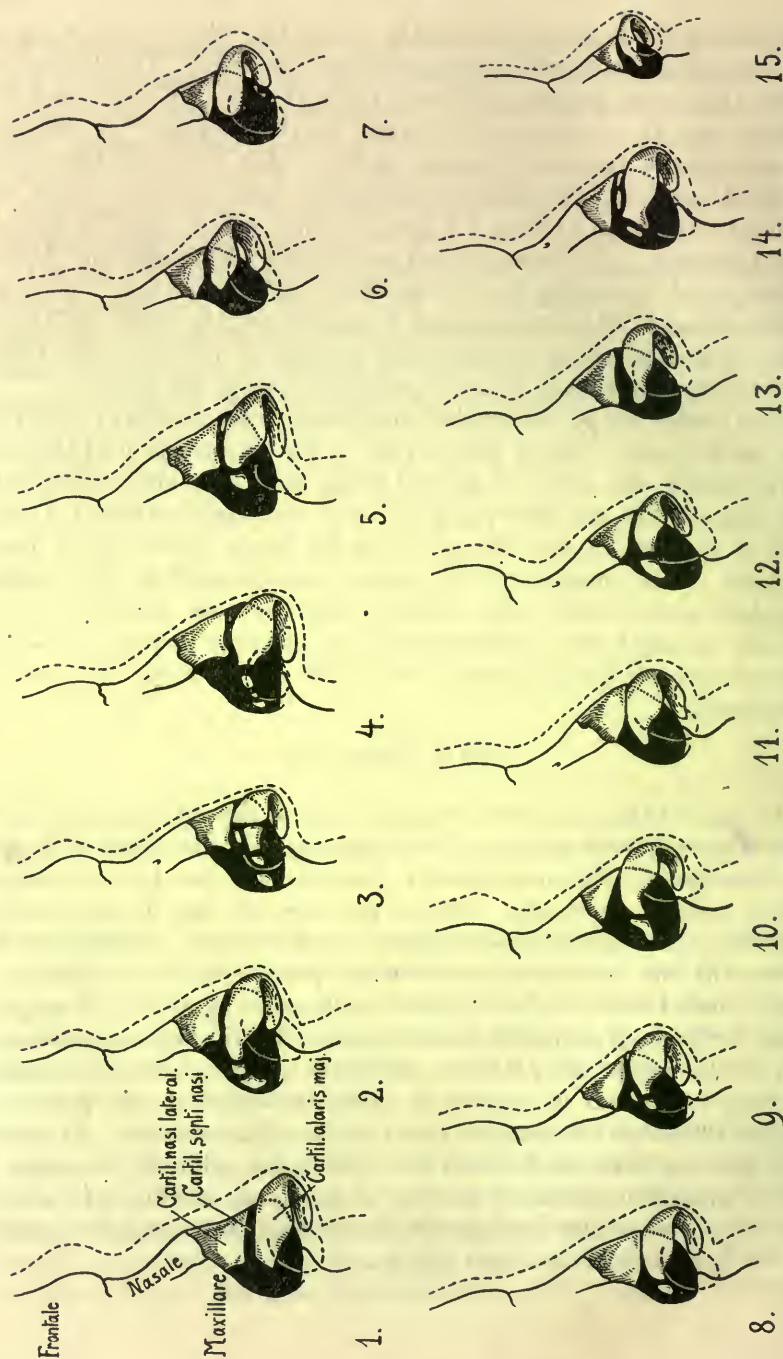


Fig. 3.—Nasal profiles and underlying bony and cartilaginous structures. Nos. 1-5, adult whites; Nos. 6-14, adult negroes; No. 15, negro child.

A definite racial difference is likewise shown in the *cartilago nasi lateralis*. In whites it assumes the form of a quadrangle—in most of the cases that of a trapezium; in negroes it is triangular. On the lateral nasal cartilage in the whites a lower and posterior border can be distinguished. These together form an obtuse, or even an acute angle which can be drawn out into a process (Nos. 3 and 4, fig. 3). Only in one white was the posterior border of this cartilage so short that the cartilage approached the form of a triangle. In the lateral nasal cartilage of the negro there is no posterior border; the lower border runs either horizontally or in a posterior superior direction, in a straight or slightly curved line. Of the entire negro material in only 1 adult and 2 children did the lateral cartilage approach the form found in whites. The size of this cartilage varies markedly; and in both races there can be found small, almost rudimentary lateral cartilages which do not extend the breadth of the nasal bones, as well as broad forms which reach far down on the maxillary border of the *apertura piriformis*. In spite of these wide individual variations it may be stated that the lateral cartilage in general is slightly smaller in negroes than in whites.

The *cartilago alaris major* may assume the most varied forms on the posterior end of the *crus laterale*. Usually this end points downward, but at times it may be drawn out into a rather long process. A definite racial difference exists also in this cartilage, in that the lower border of the lateral *crus* in whites runs for a considerable distance parallel to the lower border of the *crus mediale*, and is situated but slightly higher than the latter. In negroes the lower border of the two *crura* form an acute angle; the lateral border is much higher in position than the medial, and as a rule the lateral lower border soon bends sharply upward and backward. This relation between lateral and medial arms of the *cartilago alaris major* was also found by Virchow (1912) in a few negroes. In a Japanese examined by the same author (1913) the lower border of the lateral arm of the greater alar cartilage turned immediately upward. Virchow considers it probable that this condition is characteristic of all the races other than the European.

There are also great variations in the size of the alar cartilage, but the material studied gave the impression that in general this cartilage is more developed in whites than in negroes. The greater alar cartilage in no case reached the edge of the piriform aperture, and only in two adult specimens did it come within 3 mm. of the latter; in the majority of the cases the distance between the two was much greater.

In the space between them, *cartilagine alares minores*, varying in size and number, may be found. In the whites they were present in 75 per cent but in the negroes in only 30.4 per cent of the cases. Between the greater alar cartilage and the lateral nasal cartilage, *cartilagine sesamoideae* were found in 37.5 per cent of the whites and in 30.4 per cent of the negroes. In both races the upper border of the greater alar cartilage lies at the same level, or more often even higher than the upper border of the ala nasi. In many of the negroes the lower border of the alar cartilage, even in its anterior portion, is situated considerably higher than the lateral border of the nostril. In size and position the ala nasi is independent of the alar cartilage, and is supported by the latter only to a very limited extent, which fact favors its mobility.

Only in the concave nose of the whites do the alar cartilages project beyond the nasal septum (Hovorka); in negroes, however, this is almost the rule. In negro children, especially, they extend far beyond the anterior border of the septum. In this race, therefore, the greater nasal cartilages come in contact in the median sagittal plane, while in whites the nasal septum intervenes and may separate them to such an extent as to form a *sulcus medialis apicis nasi* on the external nose, particularly where the skin is thin over this region. Lehmann-Nitsche (1915) observed this sulcus in only a small percentage (all male) of many thousands of whites, and never among South American Indians. The author has never found it in the North American negro, but it does not appear to be so rare in whites, and is not limited to the male sex. This sulcus may be present only in the lower surface of the nose, and is then called *sulcus medialis septi mobilis nasi*.

All the nasal cartilages show racial differences in form, and seem to be more developed in size in whites than in negroes. This condition may be considered as a consequence of the greater prominence of the nose in whites, which demands more cartilaginous support, and involves a greater prominence of the nasal septum. Without doubt the human nose is morphologically a progressive structure. It would seem, however, that the increase in prominence of the nose occurs in a passive manner, as a consequence of the reduction of the dental arch (fig. 4). As the lips are drawn backward by the decrease in size of the dental arch, the nose maintains its original position, thus projecting relatively more. A support for this hypothesis is found in the nasal spine, which represents a median remnant of a formerly more prominent inter-maxillary bone. Among negroes the author found the nasal spine much less developed than in the whites, and Hamy (1869) states that the average

length of the spine in negroes is 2.6 mm., in prognathous Europeans 4 mm., and in orthognathous Europeans 5.5 mm. Macalister (1898), in speaking of a group of European skulls, makes the following statement:

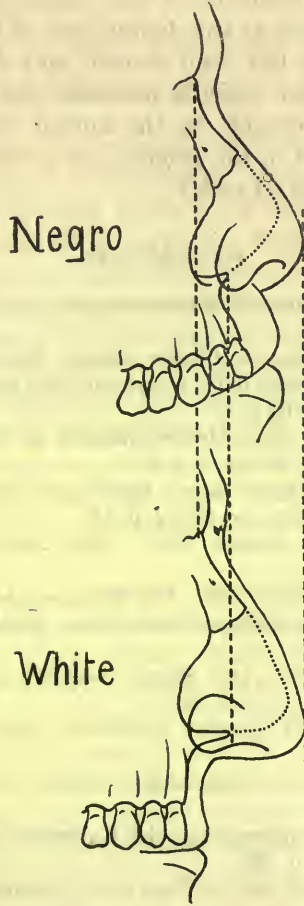


FIG. 4.—Profile of the upper face and underlying bony structure of a negro and white, to demonstrate schematically the prominence of the nose in a prognathous and an orthognathous race.

“In these crania the teeth are smaller and the whole alveolar arch is shorter, so the incisor alveoli do not extend forwards to the same proportional distance as they do in the crania of other groups. The nasal septum, however, does not

commensurately diminish; therefore the nasal spine which remains to support the lower and front part of its cartilaginous portion, projects prominently in front of the plane of the incisor alveoli."

This explanation of the prominence of the nose is analogous to that given for the prominence of the chin, which likewise has not receded to such a degree as the dental arch of the mandible. In recent times this theory has been denied, and the origin of the chin has been ascribed to the ossicula mentalia and to periosteal deposit of bone.¹ It seems probable to the author that the factors mentioned here play a part in the prominence of the chin, together with the reduction of the dental arch.²

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¹ The literature on this subject cannot be discussed here.

² In a considerable number of older fetuses and infants, both white and negro, the author found ossicula mentalia in the two races in equal frequency and size, yet in spite of this the negro presents a less developed chin.

THE ILLEGITIMATE CHILD AND WAR CONDITIONS

EMMA O. LUNDBERG

Federal Children's Bureau

The year in which was initiated the world war with its overwhelming loss of life, marked also the beginning of a tremendous upheaval of social thought and action, resulting among other things in new conceptions of the meaning and worth of human life. What permanent transformations will come from the war cannot be foreseen. But already there has been a significant readjustment of human values. The balancing of the relation between the State and the individual, the necessity for conservation of the State's human resources, the high evaluation of virile future generations, have become important issues in the midst of the terrible waste of life and health. The State has taken a new interest in all that concerns the physical welfare and biological future of its people, and measures that before the war were left to the haphazard action of private effort have become the accepted duty of the Government.

One of the issues that has gained an accession of interest as a result of war conditions is the problem of illegitimate children. Before the war, this subject had been widely discussed, but with the emphasis most largely on the one of its aspects that concerned the moral and causative side. Since the war the emphasis has shifted to the other phase, more strictly anthropological—the national value of such a child, and the present unfavorable prospects for the proper bringing up of such children. Not because of relative numerical importance, but because of better understanding and greater necessity, have these children of unsanctioned conception received the particular attention of the legislative assemblies of probably most of the countries at war, as a fundamental measure of protection of child life.

Vital statistics in European countries have brought out the fact that a high illegitimacy birth rate not only points to certain social conditions but, most important, that under notions and circumstances such as existed up to the present, means a high infant death rate. Generally the death rate in European countries is reported as more than twice as

high for illegitimate as for legitimate infants, though they are probably born equally potential as to vitality. Not only have the countries at war taken extraordinary measures to protect these infant lives, but they have greatly extended their efforts to provide for these children a larger measure of normal upbringing and training, taking them under the guardianship of the State for the protection of their future interests.

In regard not only to the situation in connection with the moral side and the question of the prevalence of illegitimacy as a result of war conditions, but also in regard to the action that has been taken in behalf of the children of illegitimate birth, many and conflicting reports have come to us. Official statistics are, unfortunately, lacking to a large extent, especially for the countries about which we hear the most astounding reports from unofficial sources. Often, these statements must be questioned because of their conflict with one another, and the evident absence of any adequate source of information. On the one hand, we have reports of State fostered relaxation of the customs that have promoted family life, and a loosening of the moral ideals that have been a foundation of society. On the other hand, we have accounts of extraordinary concern by the State for the welfare of children who are born into these conditions. From one source we hear of the added emphasis placed on family homes for children, and from another of the taking over altogether of parental obligations and the institutionalizing of children by the guardian State. Where the truth may lie between the conflicting extremes, we can only attempt to gauge by analyzing the somewhat meager data that we are able to secure from official sources, allowing for the abnormal conditions that prevail as a result of war conditions in certain areas to give us the other extreme for which we have no acceptable information.

In order to understand the extent of the problem of illegitimate births and something of its distribution according to racial groups and localities, it is necessary to study the situation as it existed in Europe before the war. The situation after 1914 must be considered to a very large extent as abnormal, and it may be assumed, temporary manifestations of disordered social states. The factors that are at the basis of this problem may, as a result of the war, change radically not only its relative importance, but may also modify still further the treatment that is accorded illegitimate children by the State and by society. Unquestionably, the individual child will become an increasingly important factor, and this consideration is bound to react on the other phases of the problem. Whatever the whole result in the longer run

will be, one inevitable outcome not only in the countries now at war, but in those at present neutral, will be a squarer facing of the issues involved and definite action by the State toward their solution primarily in the interest of child welfare.

In most European countries vital statistics are, because of their bearing on military service and other governmental requirements, complete and accurate to a degree not attained in the United States except in a few localities. These data on births and deaths are the subject of much research and analysis by governmental authorities and international statistical bodies, and are, therefore, readily available for purposes of comparison. Undoubtedly, differences of method in the various countries must be taken into account, and in some countries there is an absence of figures from any official source, as in Russia, where the records of the Church supply the vital statistics data. In studying comparative figures on the prevalence of illegitimate births it must be borne in mind that in addition to completeness of birth registration, such factors as the legal definitions of illegitimacy enter into the rates, hence the figures are only approximately comparable. Two methods are used for obtaining illegitimacy birth rates. The most common, because it is most readily computed, gives the proportion of illegitimate births to total births, usually stated in terms of number of illegitimate births to a thousand total births. This method, aside from its greater availability, has to commend it the fact that it emphasizes the size of the child care problem involved, and forms a basis for study of comparative death rates of illegitimate and legitimate infants. The second method, generally accepted by European students of the subject as furnishing the more accurate index, is based on a comparison of the number of illegitimate births with the number of unmarried, widowed and divorced women of child-bearing age in the community. This gives data on the prevalence of illegitimate births particularly applicable to the moral side of the question.

The writer has gathered, in Table I, comparative data on the rates of legitimate and illegitimate births based, respectively, on the total number of married women, and the number of unmarried, widowed or divorced women in the various countries. These figures are of interest as showing the trend of the general birth rate over a period of years, the illegitimacy birth rate over the same period, and a comparison of the two. The most striking thing brought out is the regularity of the absolute decline, not only of the legitimate birth rate, but of the illegitimacy rate as well. With the exception of Ireland, all the countries for which we

TABLE I.

NUMBER OF BIRTHS IN PROPORTION TO THE NUMBER OF WOMEN FROM 15 TO 49 YEARS. ANNUAL AVERAGE, INFANTS BORN LIVING¹

COUNTRIES	LEGITIMATE INFANTS TO 1000 MARRIED WOMEN, 15 TO 49 YEARS	ILLEGITIMATE INFANTS TO 1000 UNMARRIED, WIDOWED, OR DIVORCED (15 TO 49 YEARS)	COUNTRIES	LEGITIMATE INFANTS TO 1000 MARRIED WOMEN, 15 TO 49 YEARS	ILLEGITIMATE INFANTS TO 1000 UNMARRIED, WIDOWED, OR DIVORCED (15 TO 49 YEARS)
Austria-Hungary:			German Empire:		
Austria—			1876-1885	269	28
1876-1885	246	44	1886-1895	258	28
1886-1895	250	44	1896-1905	243	26
1896-1905	242	41	1907-1914	196	23
1908-1913	219	30	Prussia—		
Hungary—			1876-1885	273	25
1876-1885	234	41	1886-1895	265	24
1886-1895	225	49	1896-1905	249	22
1896-1905	216	41	1907-1914	204	21
1906-1915	198	38	Bavaria—		
Bosnia and Herzegovinia—			1876-1885	276	42
1907-1914	247	5	1886-1895	263	39
Belgium:			1896-1905	259	37
1876-1885	264	19	1907-1914	214	31
1886-1895	238	20	Saxony—		
1896-1905	213	17	1876-1885	267	47
1908-1913	161	12	1886-1895	250	43
Bulgaria:			1896-1905	216	41
1896-1905	266	2	1907-1914	153	36
1910-1911	280	4	Wurtemberg—		
Denmark:			1876-1885	288	29
1875-1884	241	26	1886-1895	259	27
1885-1894	234	24	1896-1905	262	25
1896-1905	217	23	1907-1914	211	21
1906-1915	191	24	Great Britain:		
Finland:			England and		
1876-1885	259	21	Wales—		
1886-1895	246	18	1876-1885	250	13
1896-1905	245	17	1886-1895	228	10
1906-1915	230	17	1896-1905	203	8
France:			1906-1915	171	7
1877-1886	166	16	Ireland—		
1886-1895	149	17	1876-1885	250	4
1896-1905	134	18	1886-1895	245	4
1910-1911	114	16	1896-1905	267	4
			1909-1912	250	4

TABLE I—*Continued*

COUNTRIES	LEGITIMATE INFANTS TO 1000 MARRIED WOMEN, 15 TO 49 YEARS	ILLEGITIMATE INFANTS TO 1000 UNMARRIED, WIDOWED, OR DIVORCED, (15 TO 49 YEARS)	COUNTRIES	LEGITIMATE INFANTS TO 1000 MARRIED WOMEN, 15 TO 49 YEARS	ILLEGITIMATE INFANTS TO 1000 UNMARRIED, WIDOWED, OR DIVORCED, (15 TO 49 YEARS)
Scotland—			Roumania:		
1876-1885	271	20	1896-1903	223	48
1886-1895	255	17	Russia in Europe:		
1896-1905	232	13	1896-1897	299	17
1906-1915	202	13	Serbia:		
Italy:			1896-1905	236	7
1877-1886	248	24	Spain:		
1886-1895	248	24	1887-1888	230	17
1896-1905	232	19	1901	232	14
1907-1914	226	14	1906-1915	218	14
Netherlands: ²			Sweden:		
1875-1884	291	9	1876-1885	240	22
1885-1894	284	9	1886-1895	231	22
1895-1904	270	6	1896-1905	219	23
1905-1914	233	5	1908-1913	196	26
Norway:			Switzerland:		
1881-1885	264	19	1876-1885	239	10
1886-1895	259	17	1886-1891	226	9
1896-1905	247	16	1896-1905	225	9
1907-1914	224	13	1906-1915	184	8
Portugal:					
1886-1895	235	29			
1896-1905	228	28			

¹ Based upon the *Annuaire International de Statistique*, publié par L'Office Permanent de l'Institut International de Statistique. *Partie II. Mouvement de la population (Europe)*, pp. 54-56; La Haye, 1917.

² The number of women has been calculated.

have figures covering from 30 to 40 years, show a decrease in the number of legitimate births in comparison with the number of married women of the age inclusion. There was a similar decline in the ratio of illegitimate births to the number of unmarried women in all of the countries except France and Sweden; in the first of these countries the rates were stable, and in the second, there was an increase. During the earliest decennial period for which figures are presented the legitimate birth rate falls in three-fourths of the countries into the

class interval 231 to 275 births per thousand married women 15 to 49 years of age. During the last time period the rate in three-fifths of the countries falls into the class interval 186 to 230. The decline in the rate of illegitimate births is less pronounced, yet there also was a consistent shift downward. In the earliest time period, in seven-tenths of the countries the illegitimacy rate falls into the groups between 10 and 29 births per thousand unmarried, widowed and divorced women; in the last period the rate in seven-tenths of the countries falls between 5 and 24.

The data presented in Table I suggest the presence of various causative factors, of anthropological, economical, or social nature. These factors can to some extent be determined by comparative studies of the elements involved. The rates in European countries for the last time period reported, vary from 4 to 38 illegitimate births to a thousand unmarried, widowed and divorced women. These variable illegitimacy rates do not readily lend themselves to explanation on the basis of racial differences nor do they conform with statistical indices of social conditions. Variation is found within groups of the same and apparently homogeneous countries, and in sections of political divisions. Among the contributing factors must be considered the differences in marriage customs and laws, such impediments to marriage as military service, economic conditions, and other restrictions, the density and distribution of the population, the prevailing standards of living, the situation as regards morals, the general attitude toward illegitimacy, and the influence of the Church and other deterrent and constructive forces. All of these elements are closely interrelated. Except for some intensive local investigations in Germany, little has been done in the way of analyses of social causes.

Table II gives the ratios of illegitimate to total births, the so-called "uncorrected rate." As has been pointed out, these figures mainly furnish an indication of the proportion of illegitimate children in the child population, and the problem the State must face in providing for their care and protection. It must be remembered, in attempting to analyze these data that a decline in the total birth rate is likely to result in an apparent rise in the illegitimate birth rate, though in fact the actual number of such births in a year may not have increased. In Great Britain and Bavaria, for example, while the rates indicate an increase, there was an actual decline in the number of illegitimate births. Other countries in which there has been a progressive decrease in the number of illegitimate births annually are Austria, Belgium, France,

TABLE II
PROPORTION OF ILLEGITIMATE BIRTHS TO ALL BIRTHS IN EUROPEAN COUNTRIES¹

COUNTRIES	TOTAL ILLEGITI- MATE BIRTHS IN 1914	ANNUAL PER CENT ILLEGITIMATE LIVE BIRTHS IN TOTAL LIVE BIRTHS										
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
Austria Hungary:												
Austria.....	102,845 ⁸	12.2	12.4	12.3	12.2	12.1	11.7	11.8	11.9	—	—	—
Hungary.....	63,301	9.7	9.5	9.3	9.1	9.2	9.2	9.2	9.0	8.5	9.5	—
Bosnia and Her- zegovinia.....	693	8.4	7.7	8.01	7.1	6.6	8.4	8.3	10.2	9.2	—	—
Belgium.....	10,975 ⁸	6.4	6.5	6.2	6.1	6.2	6.3	6.5	6.2	—	—	—
Bulgaria.....	1,156 ⁶	4.5	4.7	4.9	6.0	6.4	6.6	—	—	—	—	—
Denmark.....	8,395	10.9	10.9	11.2	11.0	11.0	11.1	11.2	11.5	11.5	11.7	—
Finland.....	6,846	6.8	7.0	6.9	7.0	7.4	7.4	7.8	7.8	7.8	8.0	—
France.....	64,761 ⁶	8.8	9.2	8.9	8.8	8.7	8.7	—	—	—	—	—
German Empire:	176,270	8.4	8.6	8.7	9.0	8.9	9.1	9.5	9.6	9.7	—	—
Bavaria.....	25,180	12.3	12.1	12.2	12.3	12.1	12.3	12.6	12.6	12.6	—	—
Prussia.....	99,172	7.2	7.4	7.5	7.7	7.8	7.8	8.2	8.3	8.5	—	—
Saxony.....	18,803	13.3	13.9	14.3	14.8	14.8	15.1	15.5	16.2	15.9	—	—
Wurttemberg....	5,737	8.3	8.9	8.4	8.2	8.3	8.4	9.1	8.8	8.5	—	—
Great Britain:												
England and Wales ²	37,329	4.2	4.1	4.2	4.3	4.3	4.3	4.3	4.3	4.2	4.4	4.8
Ireland ²	2,943	2.6	2.5	2.5	2.7	2.8	2.8	2.8	2.8	3.0	3.1	3.0
Scotland ²	8,879	7.0	5.3	6.9	7.3	7.3	7.6	7.3	7.1	7.2	6.9	7.1
Italy.....	52,813	5.3	5.2	5.0	4.9	5.0	4.9	4.8	4.7	4.7	—	—
Netherlands.....	3,728	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.3	2.2
Norway.....	4,406	6.9	6.7	6.8	6.7	6.6	6.8	6.7	7.2	7.1	—	—
Portugal.....	20,601 ⁵	11.4	11.3	11.2	11.3	11.0	—	—	—	—	—	—
Roumania.....	25,367 ⁷	9.6	9.0	9.2	8.6	8.7	8.4	8.1	—	—	—	—
Russia in Europe ³ ..	118,159 ⁴	2.4	2.3	2.2	2.3	—	—	—	—	—	—	—
Serbia.....	1,581 ⁵	11.8	12.8	12.2	14.2	14.1	—	—	—	—	—	—
Spain.....	28,858	4.4	4.5	4.6	4.7	4.8	4.8	4.7	4.7	4.8	5.0	—
Sweden.....	20,160 ⁸	13.0	13.1	13.4	14.0	14.3	14.8	15.3	15.4	—	—	—
Switzerland.....	4,341	4.4	4.4	4.5	4.5	4.5	4.5	4.6	4.8	4.7	5.0	4.6

Annual percentage based on statistics of live births reported in the *Annuaire Internationale de Statistique*, publié par L'Office Permanent de L'Institut International de Statistique, Partie II. Mouvement de la population (Europe), pp. 40-53

² See Registrar General's report.

³ Excluding Finland and Poland.

⁴ 1909.

⁵ 1910.

⁶ 1911.

⁷ 1912.

⁸ 1913.

Great Britain, Italy, Norway, and the Netherlands. Increases in the annual number of illegitimate births during a thirty to forty year period have occurred in the German Empire as a whole, especially in Prussia, and in Bulgaria, Denmark, Finland, Bosnia and Herzegovina, Hungary, Portugal, Roumania, Russia in Europe, Serbia, Sweden, and Switzerland. It is to its aspects as a problem of child care and dependency, and the seriousness of the mortality rate of illegitimate infants, that the European countries are turning in their interest in illegitimacy as a social issue of the greatest concern at the present time.

In the social changes that came when Europe was plunged into war, old customs were uprooted, the existing order was disturbed, and revolt against conservative ideals seemed likely to alter the standards that society had sanctioned. The economic and social relations of the sexes were altered; artificial distribution of population resulted from concentration of men in army camps; emotional disturbance was a part of the war excitement; the growing independence of women, economically and socially, forecast freedom from restraints. On the other hand, the added responsibilities and the seriousness of the times, the greater individual freedom of women, and the general absence of leisure time, might be presumed to have counteracted these conditions to a considerable extent. Also, we must take into account the increased number of marriages early in the war, and the large proportion of the men removed to the front.

In England the Registrar-General has called attention to the fact that the war has produced no perceptible effect on the statistics of illegitimate births, in spite of predictions current in the early months of the war. The following figures for Great Britain and Ireland are from the annual reports of the Registrar-General.

NUMBER OF ILLEGITIMATE BIRTHS AND PERCENTAGES TO TOTAL BIRTHS,
1913-1916¹

YEAR	ENGLAND AND WALES		SCOTLAND		IRELAND	
	Total illegitimate births	Per cent of total births	Total illegitimate births	Per cent of total births	Total illegitimate births	Per cent of total births
1913	37,909	4.3	8,548	7.1	2,821	2.8
1914	37,329	4.2	8,879	7.2	2,943	3.0
1915	36,245	4.4	7,875	6.9	2,953	3.1
1916	37,689	4.8	7,783	7.1	2,718	3.0

¹ Vital Statistics as Affected by the War. By Mallett (Sir Bernard), Presidential Address, *J. Roy. Statist. Soc.*, 1918, LXXXI, Part I.

In 1915, the first year in which war conditions could have affected the illegitimacy birth rate, the total illegitimate births in England and Wales decreased 3 per cent. In 1916 there was an increase of 1 per cent over 1914. In Scotland the number of illegitimate births in 1915 was 11.3 per cent, and in 1916, 12.3 per cent lower than the rate in 1914. In Ireland there was an increase of .3 per cent in 1915, and in 1916 a decrease of 7.7 per cent over the number for the year preceding the war. The ratios of per cent of total births are practically even, the only appreciable rise being in England and Wales for the year 1916. Taking the corrected rate¹ based on the number of illegitimate births in proportion to the unmarried and widowed female population 15 to 45 years of age, the rates for England and Wales were 7.9 in 1913; 7.7 in 1914; 7.4 in 1915; 7.6 in 1916. By this more accurate method it appears that there was an actual decline in the years following the outbreak of the war.

For Germany we have available no official figures on the birth and death rates after 1914. A secondary source, a bulletin published in Denmark in March, 1917,² furnishes data on the comparative birth rates in Germany in 1913, 1914, 1915, and 1916, but the figures are derived by estimating the total number of births in the Empire on the basis of statistics from places with more than 15,000 inhabitants, and the kingdom of Saxony. By this method, the statement is made that the total number of births in Germany in 1915 decreased 23 per cent as compared with 1913, and in 1916 decreased 40 per cent on 1913.

It will be seen by Table II that the total illegitimate births in the German Empire in 1914 were 176,270. From 1906 to 1914 the proportion of illegitimate to total births averaged 9 per cent. Figuring the same rate of decrease for illegitimate as for legitimate births, if this percentage had been maintained in the years of the war, the total illegitimate births in 1915 would have been about 130,000, and in 1916, about 100,000. What the actual figures are probably is not known except to official Germany itself. That there has been an increase of considerable proportions is the testimony of various writers with more or less first-hand information. Some of the figures that we see quoted in regard to the number of illegitimate births in Germany since the beginning of the war overreach the probable total of all births, in con-

¹ Mallet, B., *o. c.*

² Bulletin der Studiengesellschaft für Seriale Folgen des Krieges. No. 3. *Die Bevölkerungsbewegung im Weltkrieg.* Copenhagen, March 15, 1917.

sideration of the total number of women of child-bearing ages in the Empire.

We have, however, statistics for Berlin, the following table being adapted from data given in the October, 1916, issue of the *Jahrbücher für Nationalökonomie und Statistik*.³ The rate of illegitimate births in Berlin has consistently been about two and one-half times as high as the rate for the German Empire, ranging for the past few years from 20 to 24 per cent of the total births in the city. According to the figures quoted, the first year in which there might have been an increment of births as a result of war conditions showed a decrease of 18.9 per cent in the number of illegitimate births as compared with the

TABLE III
PERCENTAGE OF ILLEGITIMATE BIRTHS IN TOTAL LIVE BIRTHS IN BERLIN
DURING SPECIFIED PERIODS

PERIOD	LIVE BIRTHS IN BERLIN		
	Total	Illegitimate	
		Number	Per cent
The year: { 1913.....	40,833	9,507	23.3
{ 1914.....	37,493	8,473	22.6
{ 1915.....	30,993	6,870	22.2
Six months, January-May { 1913.....	17,764	4,216	23.7
{ 1914.....	16,212	3,990	24.6
{ 1915.....	15,031	3,430	22.8
{ 1916.....	10,176	2,419	23.8

preceding year, and a decrease of 26.8 per cent as compared with the year 1913 when entirely normal conditions might be assumed to have prevailed. If these figures are reliable, they indicate a greater rate of decrease in the number of illegitimate births than in the total number of births, the decrease for which is given as 17.3 per cent in 1915 over 1914, and 24 per cent over 1913. It will be seen that the rate of illegitimate to total births remained practically constant. The rates based on figures for six-month periods may point to a slight increase in 1916, but as shown by the figures for the half-year and year periods for 1914, it is evident that this is not a reliable index for the year.

³ Article on Infant Mortality, Birth Rate and General Mortality Rate in Berlin during the War, 548-554.

The only other warring country for which we have any data for a period affected by the war is Hungary. Here the illegitimate birth rate in 1915 showed an increase of 1 per cent over that of 1914, although the increase over the preceding years was very slight. The rates for Hungary over a period of years have been practically the same as for the German Empire. For Austria, the rates have been from 2 to 3 per cent higher.

The changed conditions resulting from the war might be expected to have affected the situation not only in countries actively engaged in the war, but also in the neutral European countries. The data contained in Table II do not, however, point to any appreciable change in the percentages of illegitimate to total births in the countries for which we have figures. In Denmark, Finland, the Netherlands, Spain and Switzerland, we find the rates for 1915 practically the same as for the preceding years. Insofar as we have figures based on the proportion of illegitimate births to the total number of unmarried, widowed and divorced women, the rates have continued to decline.

On the other side of the question—the status and care of illegitimate children—we have positive evidence. Changes have proceeded along three lines: (1) Improvement in legal status, making the process of determining paternity more easy and available; changes in methods of legitimation; removal of the illegitimacy record from birth certificates; and placing illegitimate children on an equality with legitimate children as to government allowances and support. (2) Provision of facilities for maternity care, and for care of children; establishment of orphanages, and extension of placing dependent children in family homes. (3) Recognition of public responsibility for the welfare of all children.

In Germany, on the very day war was declared, provision was made for separate allowances for the support of the dependents of soldiers. This law did not, however, include illegitimate children, but the Government soon made a special arrangement for extending the allowances to them provided the responsibility of the father for their maintenance had been legally established. In order to provide against the difficulty of securing documentary evidence, preventing many children from securing the allowances, the strict and legal formalities previously required were abrogated. In Austria-Hungary and in England, similar separate allowances have been granted, and provision made for pensions to be paid to illegitimate as well as legitimate children. Marriage by proxy has been instituted in France and Italy, largely for the

purpose of legitimating children, thus providing for their support. In 1917 Russia extended separation allowances to illegitimate families providing that the soldier makes a written application to that effect. Germany has gone farther than any other country in removing the stigma from the record of the illegitimate mothers and their children. During the winter of 1916, the German State Governments with the exception of Prussia, abolished the illegitimate birth certificate. In March, 1918, the Prussian Minister of the Interior stated that he had ordered a new form of birth certificates on which no reference should be made to the parents. This was done out of regard for the illegitimate children.

In England, as in Germany, war conditions have focused attention on the need for the prevention of infant deaths, and the abnormally high death rate among illegitimate infants. Special measures have been taken for assisting unmarried pregnant women. Maternity care has been provided and maternity benefits extended to include these mothers. Public and private agencies have done much in assisting unmarried mothers to keep their children and care for them properly. In Austria, special provision is made for support of the mother during confinement and for a period following the birth of the child.

In Germany, long before the war, illegitimate children were the subjects of special guardianship by the State. The war showed the need for more comprehensive measures for their protection. Most of the States had laws providing for some form of guardianship over illegitimate children. The application of these measures was left to individual towns and local authorities. In Leipzig and some other cities, a scheme was instituted under which doctors and nurses were appointed to look after all illegitimate children. In Berlin the official guardians arrange with the infant welfare centers to supervise infants coming under their care. The Public Guardians of Berlin had under their care in 1912, nearly 5,000 illegitimate children, one of their special functions being to secure maintenance for them from their fathers. In Mannheim the municipal authorities in 1913 undertook complete supervision over all illegitimate children, extending to them also medical and nursing care. During the war, the various forms of guardianship have been exercised with greater care than formerly. In Breslau it was decided, early in 1917, to give allowances from municipal funds to unmarried mothers who wish to bring up their children themselves. These mothers may be assisted in learning a trade.

In Austria an Imperial Order⁴ was issued in October, 1914 providing for the administration of guardianship over dependent children, and establishing the office of Chief Guardian. The guardianship was placed in the hands of individuals, child-caring agencies, or public bodies, each community determining the kinds of cases to which guardianship should apply, and working in coöperation with the local guardianship court. It is especially provided that the Chief Guardian may assume permanently the guardianship of all or certain groups of illegitimate children in the district who have no legal representative. He may be charged with certain specific rights and duties, such as supervision of the child, collection of money paid for the child's support, and similar duties of a legal representative. The birth of an illegitimate child must be reported by the midwife to the Chief Guardian. The children under supervision must be examined by a physician from time to time, and the manner of bringing up and caring for them regularly investigated.

In July, 1917, two very similar pieces of social legislation were passed in France and in Italy. By these "War Orphan Laws," these countries received the children who had become dependent as a result of the war, into the guardianship and protection of the State. The French and Italian laws follow, in general, similar lines of organization and they have the same purpose in view. Aid is extended not only to children orphaned by the war, but also to those whose father or mother has been incapacitated from earning a livelihood as a result of the war.

Under the French law, no distinction is made as to the legitimacy of birth. In the Italian law, illegitimate children are specifically included under the provisions for State aid and protection, provided their paternity has been established.

According to the French law,

"When the father or person providing support of the ward is dead or reduced to total incapacity for earning a livelihood, the Nation assumes the partial or total charge of the material upbringing and of the education necessary to the normal development of the ward, in case the resources of the family are insufficient."

There is created in Paris, a "National Office of the Wards of the Nation." At the headquarters of each department there is established a "Departmental Office of the Wards of the Nation," under the general supervision of the National Office. The duties of the Departmental

⁴ Sec. 208 of General Civil Code.

offices are: To scrutinize the laws protecting childhood; to place in families or foundations, or in public or private educational establishments, the wards whose guardianship or provisional care is confided to their office, or whose parents or guardians solicit intervention; to inspect and supervise institutions and organizations. Cantonal sections are created to assist the Departmental offices in carrying out the intent of the law. The benefits of the law are extended to the children of French subjects and Colonials, and to those of foreigners serving in the French armies.

In both France and Italy the immediate step for consideration of measures to be taken for the child's welfare is the formation of a "family council," and the nomination of a guardian. Assistance is to be rendered preferably leaving the child in his own family or with his guardian, though provision is made for placing orphans in charge of institutions or organizations standardized and inspected by the State.

The rate of illegitimate births in the United States, insofar as we can assume that the sections for which adequate data are available are representative, is considerably lower than that in most European countries. Inadequacy of birth registration in this country makes it impossible to make proper comparisons, but apparently the usual proportion of illegitimate births to total births is from 3 to 4 per cent. Within the past few years the whole question of illegitimate births has received a great deal of attention, though generally at the hands of private organizations rather than as a State problem. Very little advance has been made in legislation pertaining to the status and support of the illegitimate child. With increased recognition of the meaning of the problem, and with the impetus that the war has given to all efforts toward conserving child life, many beneficial changes in this respect will doubtless come in the United States as in European countries. In the Federal law providing for allotments and granting allowances to the dependents of soldiers, governmental recognition was given to the equal needs of all children for proper support. Here illegitimate children were placed on the same basis with legitimate children as being entitled to support by the father and by the Government. Whether or not conditions that have come since the United States entered the war, will affect the illegitimate birth rate, it is too early to determine. Regardless of whether the numbers are increased or decreased, it cannot be doubted that these children, who from the anthropological point of view are in no way inferior, but who by the conditions of their birth are in special need of protection, will, as a result of the war, become in a larger measure the special concern of the State.

LITERATURE

I. ANTHROPOLOGY IN GENERAL; ANTHROPOLOGICAL RESEARCH

CLIMATE, CONSIDERED ESPECIALLY IN RELATION TO MAN. By Ward (Robert De Courcy)—2d rev. ed., N. Y. & Lond., 1918 (The Science Series, G. P. Putnam's Sons).

Professor Ward has given us herewith a well-written, conservative, unbiased work, dealing with climate in relation to man, and more particularly with the multiple relations of climate to man's spread, settlements and activities. The book is remarkably free from speculation and hypotheses; it is instructive and thoroughly safe for any reader.

The parts devoted more directly to the effects of climate on man (Chapter VII-XI) discuss the subjects of hygiene and disease under various climatic conditions, the physiological, habitual and other adaptations of man in the various zones, and the supposed "changes of climate" and their action on man during the historic times in various parts of the world. With Gustave Michaud and others the author believes that, while the whole question is very complex, yet in cases even racial distinctions may be more or less directly traceable to climate, which applies particularly to differences of character and behaviour.

Professor Ward is justly quite skeptical of opinions such as those of Ellsworth Huntington, relating to various historic, important and synchronous changes in climate in different parts of the world, and their far-reaching influence on human settlement, culture, etc. "While accepting the possibility, or even the probability, of climatic variations, it is clearly the general consensus of expert meteorological opinion that there is no sufficient unimpeachable evidence for believing in permanent progressive changes of climate within historic times. 'Not proven' is the verdict of the majority of climatologists who have thus far studied the evidence."

Climate is a great complex, and much remains to be done not only in the study of its variations, but "also in the investigation of the human relations of such variations."

MAN'S VARIATION: OSTEOLOGY

TWO CASES OF CONGENITAL SUPERIOR RADIO-ULNAR SYNOSTOSIS. By Greig (David M.)—*Edinb. Med. J.*, Apr., 1917, 281-284.

"Probably not such an uncommon condition as might be thought, but still of sufficient rarity to merit report, radio-ulnar synostosis takes

¹ Reviews and abstracts by Associate Editors or Authors will be initialed or signed; those not initialed or signed are by the Editor-in-Chief.

its place among the congenital deformities." Existence of the condition has been known for more than a century. In the two cases that came to the author's notice "there is a striking similarity in the defect occurring in otherwise vastly different subjects." The first occurred in a young Scotchman of 19, the second in a male child of English parentage. Radiogram shows in each case fusion of radius and ulna in upper [proximal] part of the bones, the rest being apparently normal. The fusion is essentially an arrest of development. It is not, however, exactly a "fusion" of the proximal epiphyses, but "a want of the splitting of the original mass into the two parts which form the superior radio-ulnar joint." Several instances of this abnormality have been reported by other observers and present extraordinary similarity. The author mentions also having found, some years ago, while radiographing a fracture of the tibia, "the tibia and fibula to be joined by a narrow band of bone which passed obliquely across the interosseous space between the two bones." There is a list of references to former publications on the radio-ulnar fusion.

NOTES ON SOME MEASUREMENTS MADE ON SUBJECTS IN THE DISSECTING ROOM. By Duckworth (W. L. H.)—*J. Anat.*, 1917, LI, 167-179.

A succinct report on the measurements of length and breadth of head and skull in 120 male and 40 female English adults from the dissecting room at Cambridge. The data are treated under the heads of averages and variability; correlation of length and breadth; relation of breadth-index of head and skull; and thickness of soft tissues. The means obtained were, length of head, m., 19.43, f., 18.6 cm.; length of skull, m. 18.67, f. 17.81 cm.; breadth of head, m. 15.15, f. 14.8 cm.; breadth of skull, m. 14.13, f. 13.87 cm.; *C. I.* of heads, m. 78.—, f. 79.6; of skulls m. 75.8, f. 78.2. The material shows a moderate homogeneity. A tendency to compensation seems to exist between the length and breadth dimensions, the length varying inversely as the breadth; in other words the correlation of length and breadth seems at first sight to be not positive but negative. Yet "there is no doubt that really the correlation between cranial length and breadth is of the positive, not of the negative order." The relation of the breadth-length index of the head to that of the skull as obtained by the author does not confirm Czekanowski's conclusions on this subject.

A NOTE ON SOME CHARTS REPRESENTING THE RELATIONS OF CRANIAL LENGTH AND BREADTH. By Duckworth (W. L. H.)—*J. Anat.*, 1917, LI, 376-391.

This valuable communication is based on that of measurements of dissecting room subjects reported by the author previously (*Ibid.* 167-179), and on several large series of measurements of crania and heads by other authors. It is essentially an inquiry into the correlation of the breadth (and height) of the skull or head, with its length, and the author is led to the following conclusions:

"1. While the line of length (representing the mode of increase in length) pursues an almost regular (i.e., uninterrupted) course in all the series, yet the line representing the accompanying change in breadth is always more or less irregular. In some instances the amplitude of the oscillations exhibits clearly the high degree of variability within a series. . . .

"2. As a net result in every series, an increasing length carries with it increased breadth. Yet the latter dimension may pursue a course of extreme irregularity, even though the general result is such as is thus described. . . .

"3. The occasional and irregular occurrence of a fall in breadth (or height) (shown in a particular part of a series with a continually increasing length) may be claimed as evidence of 'compensation.' But unless the decrease is uniformly exhibited, 'compensation' can only be indefinite and vague in its reference. . . .

"4. No specific distinction has been detected as between brachycephalic and dolichocephalic series. But the brachycephalic series brought here into comparison provide indications of a more regular progression in respect of breadth-increase than do the dolichocephalic series. . . .

"5. Irregularities are more pronounced at the limits (upper or lower) of a series. . . .

"6. In some instances, a temporary interruption of correlation appears, for breadth remains constant in two successive groups (though length varies). . . .

"7. Sudden alterations in the direction of the 'breadth-line' have been traced in numerous instances to particular specimens. These may be termed 'aberrants' in contrast with their congeners. . . .

"8. The mention of the counterbalancing of individual peculiarities by the levelling mass of a large number of associated specimens leads to the consideration of the effect of actual numbers upon the appearances shown by the charts. Numbers are, however, not always capable of 'smoothing' a curve in these instances."

TWO CASES OF CONGENITAL SYMMETRICAL PERFORATION OF THE PARIETAL BONES. By Greig (David M.)—*Edinb. Med. J.*, Mar., 1917, 205-209.

Reports of a second case of the abnormality observed in life (first case reported by him in *J. Anat. & Phys.*, 1892). The two cases occurred in brothers, of Scotch extraction. The older of these men, well conscious of the anomaly, claimed that neither of his parents, nor any other brother or sister, nor his own children, had a similar peculiarity. The perforations are large, each measuring about $1\frac{1}{4}$ inches (4 cm.) in length by $\frac{3}{4}$ inch (2 cm.) in breadth.

According to the author "only fourteen examples of this deformity have now been described;" and the deformity "is essentially a want of transformation of membrane into bone round the region where the frequent parietal foramina are normally found."

ON THE CAUSATION OF THE NAEGELE AND ROBERT PELVES, with a description of one hitherto undescribed specimen of each. By Hart (D. Berry)—*Edinb. Med. J.*, Jan., 1917, 4-15.

The author reports interesting cases of abnormal pelves under the above names, and advances the theory that "the forms of the Naegele and Robert pelves are the result of polar losses of the size elements of the alae sacri and innominate bones, due to maturation of the sperm- and germ-cells. In these, a loss of ala sacri and innominate determinants has occurred, a great rarity, more often a unilateral loss (Naegele) than a bilateral one (Robert). The sacro-iliac ankylosis is due to the fact that by such losses (bony elements and joint elements) the part remaining, imperfectly developing, becomes ankylosed. As this is a germ-plasma change, and multiplication of the reduced elements occurs, it may be transmitted." A bibliography is appended.

MODERN PROBLEMS OF EVOLUTION, VARIATION AND INHERITANCE IN THE ANATOMICAL PART OF THE MEDICAL CURRICULUM. By Huntington (George S.)—*Anat. Rec.*, 1918, XIV, 359-446, 17 pl., 18 fig.

Part of a symposium on "the teaching of anatomy and the inoculation of scientific methods and interests," given during the 34th session of the American Association of Anatomists, Dec. 27, 1917. The bulk of this valuable contribution deals with the phylo- and ontogenetic history of certain skeletal variations. These include those of the pectoral girdle, the epicondylar (or "ent-epicondylar") process of the humerus and the lower portion of the spine, but the paper touches also on certain conditions of the ribs, sternum, and some muscles.

Professor Huntington gives the following classification of the variations:

I. Ontogenetic Variants

A. Errors in Development.

1. Arrest of normal development.

Examples: Harelip, Cleft palate, Hypospadias, Vesical exstrophy, certain instances of Renal dystopia.

2. Failure of normal development.

Examples: Defect of the pectoral muscle group; single kidney.

3. A typical development of vestigial structures of a transitory character in normal development.

Examples: Right Aortic Arch and other main Variations of the primary aortal branches in Man.

4. A typical development of permanent vestigial structures.

Example: Usual development of the muscles of the external ear.

5. Errors in definition of muscular integers.

(a) In Cleavage into successive muscular planes.

Examples: The group of the intermediate pectoral muscles, Tensor semi-vaginae articulationis humero-scapularis, Pectoralis minimus, Costo-coracoideus.

- (b) In Segmentation into components within the confines of a single muscular plane.

Examples: The deep Axillary Arches.

- (c) In Migration.

Example: The Sternales.

- (d) In Metamorphosis.

Examples: Mutual relation between Ischio-coccygeus and Lesser Sacro-sciatic ligament, between Levator ani and Obturator fascia.

B. Reversional Ontogenetic Variants.

In these the variation possesses a phyletic significance, but appears in the normal ontogeny of the species and is lost typically in the course of later development.

Example: 13 free ribs.

C. Progressive Ontogenetic Variants.

Normally developed structures lose their typical relations during later stages, in conformity with an advancing evolutionary process.

Example: Variability of 12th rib and its default as a free skeletal segment by synostosis with the 19th vertebra.

II. *Phylogenetic Variants.*

A. Reversional Phylogenetic Variants.

1. Archeal Group, signalized by the appearance of characters belonging to the mammalian ancestry, and hence occurring in fossil and extant reptilia and widely distributed throughout the mammalian phylum.

Example: The ent-epicondylar foramen and the associated skeletal, muscular, arterial and nervous modifications around the distal extremity of the humerus in Man.

2. Progonal Group. The qualification 'progonal' is intended to designate a variant whose degree of phyletic relationship falls within the limits of the general mammalian organization, in contrast to the first or 'archeal' group in which the variant character appears as a heritage derived from the promammalian reptilian ancestry.

Example: Certain muscles of the pectoral girdle.

3. Ataval Group. The term 'ataval' is here used to designate a more direct ancestor, an 'atavus' or grandfather, in contradistinction to a more distant forbear, the 'progonus.' The majority of human reversional variations fall within this group.

Examples: Certain muscles; arrest of pelvic advance at 26th vertebra.

B. Progressive Phylogenetic Variants.

Two examples may be taken as illustrating evolutionary processes at present active in human organization and looking toward their distant future inclusion in the normal structure of the body.

1. Variation in the vertebral level of the pelvic girdle.

Pelvic advance and retardation; and

- (a) The ontogenetic loss of the free 13th rib which becomes incorporated in the first lumbar as its transverse process, according to the results of Rosenberg, which are, however, questioned by Bardeen.
- (b) The occasional default of the 12th rib, making the formula Th. 12 L 6.
- (c) The reduction of the 11th and 12th costo-transverse articulations and the fact that the 11th costo-transverse joint, although laid down in the embryo, is lost during subsequent development.
- (d) Reduction and great variability in the development of the 11th (15-28 cm.) and 12th (2-27 cm.) ribs.

Variations, both total and divisional, in the number of vertebral segments.

The occurrence of lumbo-sacral transitional vertebrae. Phylogenetic evidence of the pelvic shift in other Primates and in lower vertebrates, and variations in the same.

2. Congenital absence of the Appendix.

There are excellent illustrations, such as only Professor Huntington can afford.

THE EXAMINATION OF A SKELETON OF KNOWN AGE, RACE, AND SEX. By Lander (Miss Kathleen F.)—*J. Anat.*, 1918, LII, 282-291.

Detailed measurements and observations on the skeleton of a 28-year old Professor of Literature of partly English and partly Jewish descent. A good photograph of the face in life is given side by side with that of the skull, and the contrast is remarkably striking as well as instructive. The skeletal parts show many peculiarities, including simple tritubercular molars and a fairly wide bilateral fronto-squamous articulation.

THE SUPRACONDYLOID TUBERCLES OF THE FEMUR. By Nadgir (Y. G.)—*J. Anat.*, July, 1917, LI, part iv, 375.

"In the October 1914 number of the *Journal of Anatomy and Physiology* Dr. J. S. B. Stopford has described the supracondyloid tubercles of the femur. His observations are based on an examination of 286 adult femora, and his conclusions can briefly be stated thus:

"(1) The medial supracondyloid tubercle is a constant structure, being absent in only one out of 286 femora examined.

"(2) In the series examined, it was sufficiently pronounced to make it possible to distinguish the medial aspect of the inferior extremity of the femur solely from its presence.

"(3) It appeared as a nodular elevation in 80 per cent, a large projection in 8 per cent, and a slight elevation in 11.2 per cent of the femora examined.

"(4) Its position is constant, being proximal to the medial condyle and lateral to the medial epicondylar line.

"(5) It is of diaphyseal origin, being present only in adult femora.

"In order to verify these statements, I examined in all 177 adult femora from the anatomical collection of the Grant Medical College, and was surprised to find that the tubercle, so constant in European and ancient Egyptian femora, was absent in 130 out of the 177 bones examined. Further, in only 8 out of the 47 bones which showed the tubercle did it approach in size the average tubercle of Dr. Stopford's series of bones. It was very slightly marked in 16 and fairly marked in 23. Thus it will be seen that in this series the tubercle was absent in 73.5 per cent, slightly marked in 9 per cent, fairly marked in 13 per cent, and well marked in 4.5 per cent.

"The cause of this marked variation regarding the presence of the tubercle may probably be explained by the peculiar habits of sitting of the Indians."

THE REDUCTION OF THE MAMMALIAN FIBULA. By Walmsley (Thomas)—*J. Anat.*, 1918, LII, 326-331.

"In most mammals the tibia has tended to become the sole medium of weight transmission between the femur and the tarsus, and the mobility of the leg bones on each other has not survived the requirements of stability. The fibula in most cases transmits little weight, and in a few species only does it articulate directly with the femur. The tibia, therefore, is constant and almost uniform throughout the series, while the fibula varies considerably, and usually exhibits different grades and types of reduction from what may be held to be its primitive form."

The author distinguishes three types of mammalian fibula, including those where "1) the distal end of the fibula is incorporated with the tibia; 2) those where the distal end exists as the os malleolare; and 3) those where the distal end of the fibula extends proximal to the proximal joint."

JAWS AND TEETH

THE FUNCTION OF TOOTH FORM. By Dewey (M.)—*Internat. J. Orthodontia*, St. Louis, 1918, IV, 141-169.

"In making a study of the various forms of the teeth as found in man and lower animals, we can not help but be impressed that the form of the tooth has had a definite relation to the function. We may go so far as to say that a tooth performs a certain function because it has assumed a certain form."

The article contains a series of very good illustrations of magnified teeth and gives detailed dentist's nomenclature of the various parts of the teeth, but is written from the standpoint of the practical dentist rather than that of a biological or anthropological investigator.

LES MUTILATIONS DENTAIRES CHEZ LES ANCIENS MAYAS. By Engerrand (G.)—*Rev. Anthropol.*, Dec., 1917, 488–493.

Reports new or not well known instances of teeth filing and teeth inlaying among the ancient Mayas and Huastecs of Yucatan and neighbouring Mexican States; also calls attention to published reports on similar practices elsewhere on the American continent. Nothing anatomical.

STUDIES OF INTERNAL SECRETIONS IN THEIR RELATION TO THE DEVELOPMENT AND CONDITION OF THE TEETH. By Gies (Wm. J.)—*Dental Cosmos.*, Dec., 1917.

These investigations were undertaken on the assumption that chemical changes may take place in developing enamel, through the influence of substances that originate outside of, and enter or affect, the cells involved in the production of enamel. This assumption seems to have been proven correct by the fact that trypan blue when injected intraperitoneally into young rats, dogs and rabbits passed freely into the enamel of developing teeth, a phenomenon which does not occur in fully erupted teeth. Also, by the fact that strontium, after oral administration daily for some time to young dogs, accumulates in the solid parts of the first and second sets of teeth. It was also found that water and simple mineral salts, such as sodium chlorid, pass freely back and forth through all parts, including enamel, of fully developed natural extracted teeth, indicating that whether or not there is true nutritive or maintenance metabolism in normal enamel, there may be physiological or pathological exchange of materials in enamel by diffusion from blood to oral fluids, and vice versa. In the course of these investigations it was found that teeth contain a glyco-protein not unlike the muscoid found in bone; that it remains in teeth during the process of their acid decalcification; that it is extractable from decalcified teeth with diluted alkalies; that it is precipitated from such alkaline extracts by mineral acids; that it is an acid protein forming colloidal salts, and that it yields reducing substance, similar to animated glucose, after acidic hydrolysis. The author regards the discovery of this hitherto unknown constituent of teeth as the most important single finding in his study of dental problems, making as it does a permanent contribution to dental chemistry.

FORM AND FUNCTION OF TEETH: A theory of "maximum shear." By Shaw (D. Mackintosh)—*J. Anat.*, 1917, LII, 97–106.

"This concept, 'maximum shear,' has been applied to explain in a more precise manner than has hitherto been done the functional meaning of many specific features in the shapes of teeth. It offers also, in the case of man's dentitions, an explanation of the chewing mechanism that fits all the observed dynamical conditions and actual results. If it be granted that teeth were evolved mainly for their utility in manipulating food, then a close and persistent study of dental mechanism from the 'machine and tool-action' point of view is a very rational

and promising method of interpreting the physiological meaning and value of any morphological feature or detail in teeth. It would seem, *a priori*, that the definiteness and constancy that characterise each specific feature in the form of a tooth might well be directly related to a like definiteness and constancy in function or functions. If a morphological feature remains, in a clearly recognized sense, fixed and distinctive throughout that particular species, the functional requirement that evoked and preserved it is admitted to be, in several *obvious* instances, similarly fixed and distinct." The hypothesis of 'maximum shear' may now be stated as follows:—"The teeth of man, alike in regard to many of their specific morphological features, the manner of interaction between the opposing rows, and the precise character of the jaw movements that are habitual and effective, are all normally adapted and used to secure in effect the dominant condition that the shearing stresses—not the compressive stresses—are at a maximum."

ABSENCE OF PRE-MAXILLA. By Walker (Cranston)—*J. Anat.*, July, 1917, LI, part 4, 392-395.

An English boy of 14 years "shows complete absence of the pre-maxilla, with the four upper incisors, and deficient ossification of the nasal septum. Other malformations are absent.

"The two maxillary processes have grown forwards and inwards, have met each other and the nasal septum in the mesial plane, carrying the canines into the incisor position, and have filled the space left by the pre-maxilla.

"The history of the case is open to doubt, but it suggests that the pre-maxilla was sloughed at the age of three during an attack of measles. A previous deficiency of attachment must be supposed. Congenital defect of the mesial nasal process is evidenced by the condition of the existing nasal septum."

MAN'S VARIATION: RACIAL

CERTAIN PRE-COLUMBIAN NOTICES OF THE INHABITANTS OF THE ATLANTIC ISLANDS. By Babcock (W. H.)—*Amer. Anthropol.*, Jan.-Mar., 1918, 62-78.

Ancient writers apparently had no real knowledge of the inhabitants of the eastern Atlantic islands.

In the twelfth century Edrisi tells of the Sara islanders who had cheeks resembling burnt wood, scintillating eyes and projecting canine teeth; of the beardless leaf-clad men on another island; of the short brown men with long beards on the slopes of an insular mountain; and of the human forms and bestial heads of Calhan.

In 1341 two vessels sailed from Lisbon to the Canaries and certain Italian letters, officially preserved, relate their experiences. On Fuerteventura they found naked savage people with many goats; on Grand Canary most were naked, but some wore goat skins well sewn. Four prisoners had beardless and handsome faces, wore aprons of dang-

ling fibres and their light hair fell to their waists. They did not exceed their captors in stature, but were robust of limb, courageous and very intelligent.

Bethencourt's chaplains dwell on the prowess of the King of Lanza-rotta in 1492, the beauty and modesty of the Lanzarote women, the tallness of the Gomera islanders, and the large stature and powerful build of the men of Fuerteventura, "difficult to take alive."

Gomez Eames de Azarura in 1448 says that the people of Teneriffe had plenty of wheat and vegetables, pigs, sheep and goats, but lived in caves. They fought with darted lances, were strong and active men and had their own wives.

In 1455, when only Teneriffe, Grand Canary and Palma remained pagan and independent, Cadamota testifies that the men of Teneriffe were "wonderfully strong and active, could take enormous leaps and throw with great strength and skill. They dwelt in caverns in the mountains."—W. H. B.

THE PEOPLE AND LANGUAGE BETWEEN THE FLY AND STRICKLAND RIVERS, PAPUA. By Murray (J. W. P.)—Communicated with notes, by S. H. Ray.—*Man*, 1918, XVIII, No. 3, 40-45.

This is mainly an ethnological report, but contains a number of interesting observations of somatological nature. The natives seen all appeared to be of the same type, and to resemble the natives of the Morehead River and the extreme west of the region, rather than others. They appeared, however, to be much lighter in color than the Morehead people. A party of six men visitors from the mountains could possibly be classed as pygmies, or, more probably, as a mixed race descended from pygmies and natives of ordinary stature. They measured only from 4' 10" in height, but otherwise were splendidly built.

RESULTATS ANTHROPOLOGIQUES DE LA MISSION DE M. DE GIRONCOURT EN AFRIQUE OCCIDENTALE. Par Verneau (R.)—*L'Anthrop.*, 1917, XXVIII, 537-568.

Concluding chapters on the anthropological results of the de Gironcourt expedition to west African tribes. The tribes dealt with in the final report are the Baribas, the Pila-Pilas and the Fons, of Dahomey. They are mostly full-blooded negroes, above medium to very tall in stature, essentially dolichocephalic, and showing marked differences from group to group. The Pila-Pilas especially stand apart.

The general conclusions reached by the author on the total results of the expedition, which included studies of the Tuaregs, the Sonrai, Dendis and Armas, the Peul, and the tribes mentioned in present paper, are that: from the N. E. of the bend of the Niger up to and including Dahomey, there exist diverse populations which from the standpoint of physical anthropology differ considerably from each other. In the north are the Touareg tribes, which though somewhat mixed with the blacks, belong unquestionably to the white race; in the southern parts of the region are found the true negroes; while in the

intermediate zone the population is of mixed character becoming more negroid as one advances southward. The Touaregs are plainly a part of the large Berber family. Of the blacks the purest and physically most interesting are the Pila-Pilas of Dahomey.

II. WAR ANTHROPOLOGY

PEOPLES AT WAR

THE PASSING OF THE GREAT RACE; or, The racial basis of European history. By Grant (Madison)—New edition, revised and amplified, with a new preface by Henry Fairfield Osborn. 8vo, N. Y., Scribner's, 1918, i-xxv, 296 pp.

This book, of which a second edition appeared half a year after the publication of the first edition, is hardly a subject for a review in a scientific journal. It is the attempt to justify a prejudice, not with the thoroughness of a Gobineau or the brilliancy of a Chamberlain, but by a superficial skimming-over of a number of commonplace observations, that are given the proper twist to suit the author's fancies. The true character of the book has been well described by an Italian reviewer, who speaks of it as a journalistic enterprise. The author talks a good deal about inheritance, unit characters, and so on, without, however, approaching anywhere scientific accuracy. The looseness of half-true statements, with which the first edition abounded, seems to have been slightly mitigated by friendly advice; but not enough has been done to give the book a claim to consideration as a scientific contribution. There are a number of serious attempts to prove the superiority of the blond race,—mistaken, as I think, but still seriously conducted,—for instance, the investigations by C. Röse; but all of these the author ignores, nor does he seem to be aware of their existence. It is unfortunate that a courteous preface by Prof. H. F. Osborn may convey the impression upon the minds of uninformed readers that the book has merit as a work of science.—FRANZ BOAS.

LONG HEADS AND ROUND HEADS or What's the matter with Germany. By Sadler (W. S.)—12 mo, A. C. McClurg & Co., Chicago, 1918, i-ix, 157 pp.

The publisher's advertisement is a fairly adequate summary of this book:

"Germany . . . stands before the world today a moral bankrupt. *Why is this and how did it happen?* Dr. Sadler says Anthropology gives the correct answer. Germany today is peopled by a docile, round-headed race with an inherited tendency to cruelty, viciousness, and with no more morals than a wolf. He claims they are Alpines, an inferior, stupid and non-progressive race, and are not real Teutons, having nothing whatever in common with that long-headed, progressive and intelligent race."

The author expresses in the preface a pious anxiety "that those who may chance to read this little book will do all in their power to put it in the hands of our boys at the front, that they may better know why America is in the war and why they have been called upon to risk their lives in defense of American homes and democratic institutions" (ix). It is sincerely to be hoped that this wish may not be realized. Not only is the book devoid of merit (and its author destitute of anthropological knowledge), but it is potentially mischievous in that it seeks to draw false and invidious distinctions between the mentality, morals and cultural achievements of three racial stocks, which separately and intermixed constitute the populations not only of most European countries, but also of the United States. It requires notice in a scientific journal only because of the possibility that it may be borne to the public attention on the wave of anti-German propaganda in which it is insidiously immersed, and thereby arouse racial prejudice among the laity.

The stupid and false hypothesis of the degeneration of the "noble" Nordic race by amalgamation with the "low and brutal" round-headed Alpines is of course no more applicable to Germany than to France or to Italy, or to almost any other country in which Nordics and Alpines have met. There is therefore no reason for the author to make his anti-Germanism a vehicle for the distribution of harmful and erroneous ideas about the relative merits of the three primary European races which in our country and elsewhere live together and intermarry with happy results, materially, politically, mentally, morally and eugenically.

The author puts the responsibility for his revelation largely upon Osborne's *Men of the Old Stone Age* and especially on Madison Grant's *The Passing of a Great Race*. Accordingly the first chapters are mainly a diluted and adulterated series of extracts from these works. Professor Osborn however should be absolved from responsibility for the absurdities and inaccuracies of this account of prehistoric man in Europe.

The following passages, which require no comment, may be quoted for illustration:

"The Neanderthals must have been a brave and hardy people, for they attacked the largest animals in the chase, such as bison, wild cattle, and horses, not to speak of reindeer." (p. 13.)

"The typical Neanderthal skeletons were first found in 1887 in a grotto near Spy on the River Meuse." (p. 13.)

"Probably the greatest flint-making station of this epoch, which was operated from the dawn of the Old Stone Age to its very close, was that found at Aschuel [sic!] on the River Somme, where there can be traced seven or eight different types of implements." (p. 16.)

"It is a question if even a trace of this ancient race (Neanderthal) was left living on the face of the earth, unless in the case of certain types previously mentioned as being found in Ireland and possibly Scotland."

"There is every reason to believe that the Cro-Magnons entered Europe through Phoenicia along the southern coast of the Mediterranean into Spain, perhaps also along the northern coast into Italy.

Their physical structure is Asiatic in type, not African." (p. 21.)

"The brain capacity of the Cro-Magnon female skull was even greater than that of the average male of today." (p. 21.)

The foregoing random extracts are typical of the author's sketch of the Paleolithic period. All this is quite irrelevant to the subject matter of the book. It is past understanding why it would be necessary to invoke misrepresentations of the Neanderthal type in order to explain the present world conflict; or how erroneous statements concerning Cro-Magnon man can be a source of patriotic inspiration to "American soldiers and sailors—native and naturalized—who are fighting in defense of home, liberty, and democracy," and to whom the book is dedicated.

The account of the Neolithic and subsequent prehistoric periods, and the description of the origin, migrations, and cultural contributions of the three primary races, is, if possible, even worse. A full enumeration of the errors would require space almost equal to that consumed by the original account.

Anthropologists have long ago abandoned the once popular but futile pastime of trying to pick the original "Aryan" race or of endeavoring to prove that one of the three primary European races has been the *fons et origo* of culture (also in this sense spelled Kultur), to the detriment of the other two. Only the Prussians and Madison Grant now believe that the Nordics are a race of supermen and archangels.

On page 35 our author states that "through the ages, the great military leaders, including Cyrus, Alexander, Caesar, and Napoleon, have all been of Nordic race—nearly all blond. . . ." We have only to add the names of Homer, Shakespeare, and Michael Angelo to this totally unverifiable list to make it identical with the claims of Prussian anthropological propaganda.

The most ludicrous paradox of the book lies, however, in the fact that the author, after consuming pages in describing the bloody part in the wars of Europe which the Nordic race has played from early times, turns about and ascribes the present ferocity of the Germans to the disappearance of the Nordic stock and its replacement by round-headed brutal Alpines.

A complete befuddlement is shown in his explanation of the Teutonic emigrations to America after the German upheaval of 1848:

"Notwithstanding the awful loss to the German people through the 'Thirty Years' War and other wars, there still remained in Germany, especially in northern Germany, a goodly percentage of the noble Teutonic people. These tall, blue-eyed Nordics have been for centuries the ruling classes of the world and they did not take kindly to the governmental methods espoused by the autocratic German (Prussian) rulers" (p. 56).

We need not plum further these unsounded depths of error.

The latter half of the volume is anti-German propaganda apparently pieced together from current periodicals and newspapers.

The publication of amateurish books on European races by uninformed persons should be discouraged.—E. A. HOOTON, Cambridge, Mass.

EFFECTS OF THE WAR ON THE RACE

PHYSICAL DETERIORATION OF BOYS UNDER WAR CONDITIONS. By Distin (Howard)—*British Med. J.*, May 11, 1918, 549-550.

In a letter to the JOURNAL the writer calls attention to the demoralizing and physically harmful effects of the present diminution of paternal control and greatly increased earnings of a large number of the English youths of between 14 and 18 years of age. Living and practising in an extensive munition area, where these conditions come directly under his observations, he is of the opinion that a very large percentage of these youths "will be found physically unfit when the time arrives for them to submit themselves to medical examination for military service. Three or four years of absence of paternal control, of practically unlimited supply of money and cigarettes, lack of sufficient sleep through frequent cinemas and music halls, and, finally, in many cases a tendency to indulgence in alcoholic drinks, must all exact an inevitable toll on the growing boy. Were it not for my wish to be brief I could give many instances of mere boys becoming physical and moral wrecks, and I have no doubt doctors in other munition areas could relate similar experiences."

CHILD WELFARE.—The May and June numbers of the *Edinburgh Medical Journal* of 1917, have been published as the "Child Welfare" numbers, and bring several articles of interest to the student of anthropological problems in connection with the war. The principal contents are as follows in the two numbers:

Report of special committee on maternity and child welfare;

The scope of preventive work in connection with the medical treatment of infants and young children;"

The care of children of the school ages;

Mother welfare in pregnancy and infant health;

Paediatrics and child welfare;

Some practical points regarding child welfare organisation;

Care of mentally defective children;

Infectious diseases in relation to child welfare;

Diseases in relation to child welfare;

Medical inspection and supervision of school children in Edinburgh.

ENGLISH VITAL STATISTICS.—The Registrar-General's return of vital statistics for 1916 in England and Wales, according to an abstract in the London *Times*, shows a reduction of 4.5 in the marriage-rate as compared with that for 1915, when it was exceptionally high, and the lowest death-rate of children under one year ever recorded.

The report refers to the difficulties of framing estimates of population owing to the war. These have become so formidable that it is no longer possible to put forward figures otherwise than as rough approximations. As the estimates (except those for birth-rate and marriage-rate) are for the civil population only, enlistment has been treated as equivalent to emigration. The estimated civil population of England and Wales was 34,000,000 in 1916 (15,000,000 males and 19,000,000 females).

The marriages during 1916 numbered 279,846 a rate of 14.9 persons married per 1,000, 0.6 below the average rate of the decade 1901-10. The marriage rates for 1916 were 49.6 for males and 41.0 for females, the lowest hitherto recorded for females, and the lowest but one for males.

We have thus (the report states) the curious phenomenon of an unprecedentedly high marriage rate in 1915 succeeded by an almost unprecedentedly low one in 1916. The flood of marriages which set in with the second quarter of 1915 did not ebb until a year later, so that considerably more marriages were registered in the first quarter of 1916 than in the corresponding quarter of any previous year. These violent changes are no doubt the direct consequence of the war, and appear in 1917 to be giving place to a less abnormal state of affairs.

There was in 1916 a notable increase in the proportion of marriages of young widows. The population of widows under thirty years of age must have been greatly increased as a result of the war. The marriage prospects of spinsters were decreased for two reasons—there were fewer marriageable males in consequence of the losses of unmarried combatants, and more marriageable females in consequence of the losses of married combatants.

In proportion to the total population, the birthrate was 20.9 per 1,000 living. The reduction of natality accompanying the war only amounted to 12 per cent, whereas in Germany the fall was reported to have been 40 per cent in the two years 1915 and 1916.

The excess of births over deaths was 277,303. The number of fatal casualties incurred by English and Welsh troops during the year, says the report, must be very much lower than 277,303, and so the increase in population must have continued. The German statistics record 1,331,000 deaths in 1916, apparently exclusive of at least the great majority of fatal war casualties, as against 1,103,000 births; and the Hungarian figures are for deaths "not in action" 428,057, as against 333,551 births.

The deaths of 508,217 persons were registered, a rate of 13.3 per 1,000. The deaths of children under one year of age numbered 71,646, or 91 per 1,000, the lowest rate ever recorded. Eighty-eight reputed centenarians died, 70 of whom were women.—*Science*.

REFLECTIONS ON WAR AND DEATH. By Freud (Sigmund)—Transl. from German, 16 mo., N. Y., 1918, 72 pp.

Speculative; of little if any biological or anthropological value.

TROUBLES MENTAUX DE GUERRE. Par Lépine (Jean), 12mo, 1917, Paris, 203 pp.

This subject interests the anthropologist mainly in so far as the mental derangement caused, awakened or aggravated by the war may have an influence on the racial potentiality of the people involved and on the progeny. The author who has given a thorough study to the subject among the French concludes that on the whole the war has failed to affect the nervous system so that the results would be dangerous to the French nation. "There has developed no mental epidemic, through fear or horror, neither in the hell of Verdun or elsewhere." On the whole the French soldier, except when carrying serious hereditary predispositions or weaknesses has borne up well under the great strain and there appears no reason so far as his nervous system is concerned for a serious apprehension as to the effect of the war on the French nation..

THE EFFECT OF WAR UPON AMERICAN CHILDREN. By McIntire (Ruth)—*The National Humane Review*, June, 1918, VI, 103 et seq.

While this well written report applies especially to economical conditions and education, these matters are so closely connected with the mortality and physical development of the children that the paper deserves a brief mention in this place. Although the war, so far as this country is concerned, is only of one year's duration, its effects on the children are already surprising and to a degree evident. They consist in a wide-spread increase in child labor, in a diminution in the numbers enrolled in the schools, and in the increase of juvenile delinquency. After pointing out a number of protective movements under way, the author adds: "America is evidently recognizing earlier than did England the imperative necessity for conserving and protecting child life. In time of war, however, the appeal to patriotism is so strong that action is apt to leap ahead of reflection. We should constantly bear in mind that not only humane reasons but selfish interests are in favor of our surrounding children at this critical time with all the safeguards possible."

INFANT WELFARE WORK IN WAR TIME. Abstract of paper read by Dr. Grace L. Meigs before Section on Health, National Conference of Charities and Corrections, Pittsburgh, June, 1917, with some additional facts from supplementary paper read before American Medical Association, Chicago, June, 1918.

The losses of war are two-fold—those of the battlefield and those represented by the decline in the birth-rate. European countries, realizing that these losses can be offset only by lowering the infant death-rate, have taken extraordinary measures for the protection of mothers and babies. The results, considering war-time conditions, have been remarkable. The infant death-rate for Great Britain for 1916 is the lowest recorded, and that for Germany, while equaled in 1913, was beaten only in 1912. Though there was a slight rise in both

countries in 1917, the rates are still low as compared with pre-war figures.

The problems of infant welfare have been approached from different angles in the various countries, but certain tendencies in common are to be observed. Everywhere, the protection of maternity is recognized as indispensable to the protection of infancy. Everywhere, likewise, the emphasis in infant welfare work is on the preventive rather than the palliative side. The intelligent care of the baby by his mother in her own home—not the day nursery—is realized to be the ideal. Though this ideal is not always attainable, efforts are bent toward making it economically possible for mothers to stay at home and toward making available for them expert advice on maternal and child hygiene. Free medical and hospital care for mothers and babies, public health nursing, prenatal and infant welfare centers, have increased in almost every country, in spite of the drawing away for war service of doctors and nurses and trained workers, and the common difficulty of obtaining funds. Of especial significance is the unwonted part taken by governments in providing nursing and maternity benefits, and grants in aid to organizations interested in mothers and children.—G. L. M.

BIOLOGY AND WAR. By Pearl (Raymond)—*J. Wash. Acad. Sc.*, June 4, 1918, VIII, No. 11, 341–360.

Men fight, 1) "because their kind of people is different from other kinds; second, because they want to make sure that their kind shall either maintain or improve its status in the world, and that which is thought to ensure most certainly the maintenance and extension of group differences in the widest sense is relative politico-social domination by the group; and third, because of a general physiological law that certain emotions tend to lead to *action*." But "whether war is a biological business, to the problems of which the trained biologist could contribute much, it is *not* an absolute necessity."

The consequences of war upon the race are not as grave as sometimes painted. "Nations neither lose nor gain biologically by war." War is supposed to be selection by eliminating the best and preserving the worst germ plasm; but the more one examines the facts, the more it is apparent that the case has been very much exaggerated. "In the first place, the future of the race, in the narrowly biological sense, is solely dependent upon the continuity of its germ plasm." But the germ plasm of the race is equally borne by both the males and females, so that even if we were to grant for the moment the contention that the best males of the race are killed off, there would still be left behind in the surviving females at least half of the total racial germ cells of all qualities, which would make it possible, through the operation of segregation, to have again a preponderant stock of superior individuals after a few generations.

"Furthermore, the hypothesis of racial degeneration by elimination of the best tacitly assumes that those males eliminated in battle have not

left progeny before their elimination, whereas, as a matter of statistical fact, a considerable portion of them do leave behind such progeny. Again it must not be forgotten that the whole of the population, both male and female, under about twenty years of age is left untouched by war, and available for the perpetuation of the race as they grow older. . . . In the second place, even in the most destructive of modern wars the proportion of totally eliminated casualties to the whole population is not very great."

"In the case of the present war, there are still other considerations which make it clear that any putative, deleterious, selective effect of war on the races concerned will be insignificantly slight. . . . The whole mode of conduct of the present war operates to make the chances for elimination of the man carrying about within his soma the best germ plasm of the race, not substantially greater than the chances of the individual bearing the poorest germ plasm."

LE PROBLÈME DE LA POPULATION APRÈS LA GUERRE. By Savorgnan (Franco)—*Scientia*, Bologna, 1918, XXIII, 2 s., 200-208.

War under present conditions has lost its selective virtue and its effects cannot be other than dysgenic. Its effects are not only the direct elimination of great masses of men from the best period of life, but also a general increase of mortality in the home population, together with a decrease of birth rate. Moreover, the progeny of those who participate in the war as well as the defectives who stay at home, will probably suffer both in physical vigor and mental energy, during the first years after the war. Further inevitable consequences of each great war has been observed to be a reduction during the years that immediately follow in the number of marriages and births among the most desirable classes of the population. To these sombre aspects of the war the optimists oppose an image of a Europe rapidly regenerating in every respect after a durable peace is once established.

According to the author the effect of the war on the population of the different countries engaged will differ from country to country, in accordance with the amount of damage that has been suffered and the recuperative potentiality of the people. The most important factor will of course be the result of the struggle. The mental influence of victory or defeat will have a great effect on the future of the different nations.

The old notions of wars being followed by natural compensation for the losses sustained through increase of births and decrease in mortality, and by augmentation of male children, the author regards as without scientific foundation. His research as to the probable effects of the present war he limits to Germany, France, Great Britain, and Italy. Taking into consideration the manhood strength of these four nations before the war, their probable losses, and their prospects of rehabilitation, he comes to the conclusions that the countries in which the losses will be compensated for the soonest, are Italy, followed by Great Britain and Germany. But as to France the problem is much

more serious. How can France, with its great losses and its low birth rate, be re-peopled?

The very important rôle which Alsace and Lorraine will play in this process is not considered; but attention is called to the probability of France, after the war, drawing for large numbers of mechanics, etc., on Spain and Italy, many of whom will marry in France and help to re-people the country. This influx of Latin blood will modify the French nation, approximating it still more to that of the Latins and leading to the formation of a Latin block of peoples extending from Flanders southward.

RÉSULTATS DE LA VACCINATION ANTITYPHOÏDIQUE AUX ARMÉES PENDANT LA GUERRE. Par Vincent (N.)—*C. R. Ac. Sc. Paris*, Oct., 1917, T. 165, 440-444.

A concise but instructive report on the results of antityphoid vaccination in the French army. Comparing the actual frequency of these diseases in the French army with that of 1911, during peace and before vaccination against them was introduced, it is seen that at present "the cases of typhoid [and paratyphoid] morbidity observed in the armies at the front are nearly seven times less numerous and the deaths [from the same] eight and a half times rarer than in times of peace."

A STATE-WIDE PLAN FOR THE PREVENTION OF VENEREAL DISEASE [in relation to war]. By McLaughlin (Allan J.)—*Public Health Reports, U. S. Public Health Serv.*, Wash., 1918, 223-37.

"In order to secure the greatest number of effectives in the selective draft, the prevalence of venereal disease in the civil population must be reduced. . . . The tremendous social and economic losses resulting from these diseases in times of peace are multiplied by the extraordinary conditions arising out of the world war. . . . The winning of the war demands that these diseases be controlled. . . ." To which might well have been added that there is an equally urgent necessity of protection of the future of the race, due to the very serious hereditary effects of some of these diseases.

The bulk of the treatise is devoted to recommendations of practicable and effective means for combating the peril.

ARMY ANTHROPOMETRY AND MEDICAL REJECTION STATISTICS. By Hoffman (Frederick L.)—8°, Newark, N. J. (The Prudential Press), 1918, 114 pp.

In this bulletin Dr. Hoffman, the best known authority in this country on medical statistics, deals, evidently in a preliminary way, with the subjects of 'General Army Anthropometry,' and with 'Rejection Data,' in this country and abroad. He refers more especially to the work of the Anthropology Committee of the National Research

Council. It is confidently hoped that some day the author will be able to give us a thorough analysis of the rejection data in this country, by race nationality, locality and occupation, which will be of considerable anthropological interest.

ANTHROPOLOGICAL AND MEDICAL WAR COLLECTIONS.—It is more than a year ago that the Committee on Anthropology of the National Research Council has called attention to the "important opportunities for additional scientific research and the collection of data and specimens" presented by the war, and the desirability of their utilization (see *Am. J. Phys. Anthropol.*, 1918, I, No. 1, 87-88); but there is no evidence that any systematic efforts have yet been made by this country in that direction. That similar opportunities are being utilized by other nations at war, is evident from an article in the *British Medical Journal* of August 17, 1918, p. 169, on the "Canadian Medical War Collection." We learn from this article that "since 1914 the Canadian Army Medical Service has coöperated with the R. A. M. C. in the endeavor to obtain adequate medical records of the war, and has been steadily working to obtain material of all kinds worthily to illustrate the medical aspects of the great struggle. . . . The collection comprises specimens of wounds, of dried bones including a remarkable series of head wounds, drawings, photographs and models. The specimens have been prepared and mounted at the College under the supervision of Professor Keith, Professor Shattock, and Mr. Beadles." It would of course be easy to supplement the strictly medical observations and collections by those of medical-anthropological nature, and some work in this direction has doubtless already been accomplished in England.

CURRENT NOTES

Mr. Gerard Fowke of Kansas City, Missouri, has been authorized by the Bureau of American Ethnology to investigate the antiquities in Central and South-eastern Missouri. The primary object of this work is to examine the contents of caves with the view to making collections of skeletal and other material bearing on the antiquity of man in the Ozark region.

A Section of Anthropology in the Division of Medical Records in the Office of the Surgeon General was created on July 23, 1918. Major Chas. B. Davenport, Sanitary Corps, N. A., has been designated as the Officer in Charge. The functions of this Section are to be:—To secure the highest quality of the measurement of recruits and of identification records as done by the Surgeon General's Office for the purposes of the War Department; to assist, as called upon, in the analysis and synthesis of the statistics compiled from medical records; to care for and help analyze physical examination records; to care for and classify identification records; and to assist the War Department in all questions about racial dimensions and differences.

"*Carry On.*" This is the name of a new journal, edited and published by the Office of the Surgeon General, U. S. A., and devoted to "the reconstruction of disabled soldiers and sailors." The first number was issued in June, during the current year the journal will be sent free to those who will apply to the Surgeon General.

The Ohio Bureau of Juvenile Research.—The Bureau of Juvenile Research was authorized by the legislature of Ohio in 1913. But as no appropriation was made for buildings the most important function of the Bureau could not be realized. The legislature of 1916 remedied this by an appropriation of \$100,000.00. Three buildings are now in process of construction. The law provides that,

"All minors who in the judgment of the juvenile court, require state institutional care and guardianship shall be wards of the state, and shall be committed to the care and custody of 'The Ohio board of administration,' which Board thereupon becomes vested with the sole and exclusive guardianship of such minors.

"The 'The Ohio board of administration' shall provide and maintain a 'bureau of juvenile research,' and shall employ competent persons to have charge of such bureau and to conduct investigations.

"The 'The Ohio board of administration' may assign the children committed to its guardianship to the 'bureau of juvenile research'

for the purpose of mental, physical and other examination, inquiry or treatment for such period of time as such board may deem necessary. Such board may cause any minor in its custody to be removed thereto for observation and a complete report of every such observation shall be made in writing and shall include a record of observation, treatment, medical history, and a recommendation for future treatment, custody and maintenance. The 'The Ohio board of administration' or its duly authorized representatives shall then assign the child to a suitable state institution or place it in a family under such rules and regulations as may be adopted.

"Any minor having been committed to any state institution may be transferred by such 'The Ohio board of administration' to any other state institution, whenever it shall appear that such minor by reason of its delinquency, neglect, insanity, dependency, epilepsy, feeble-mindedness, or crippled condition or deformity, ought to be in another institution. Such board before making transfer shall make a minute of the order for such transfer and the reason therefor upon its record, and shall send a certified copy at least seven days prior to such transfer, to the person shown by its records to have had the care or custody of such minor immediately prior to its commitment; provided, that, except as otherwise provided by law, no person shall be transferred from a benevolent to a penal institution.

"The 'The Ohio board of administration' may receive any minor for observation from any public institution other than a state institution, or from any private charitable institution or person having legal custody thereof, upon such terms as such board may deem proper."

It is thus seen that the Bureau is in reality a State clearing house for all juveniles under eighteen years of age. To this clearing house all State cases must be sent, while the help of the Bureau may be invoked by any institution public or private, or any parent or guardian who has need of its services.

In July, 1917, the Board of Administration offered the position of Director of the Bureau to Henry H. Goddard, of Vineland, N. J. Not until March of the following year did he signify his willingness to accept. He assumed the duties of the position May 1 of this year.

It is planned to organize as rapidly as possible a staff for the complete study of each case. This will include an investigation of the physical and mental condition of the child, also of his moral and social history together with the hereditary and environmental influences. From all these factors an attempt will be made to ascertain the reasons for his anti-social conduct and to provide a proper treatment for each case.

Studies already made in many places throughout the country indicate that some juvenile delinquents are insane, some are feeble-minded, some suffer from obscure forms of epilepsy, while others are clearly unsound in mind or body; and some are the victims of unfortunate environment, or other influences unfavorable to healthy normal conduct.

All cases that can be quickly diagnosed will be at once disposed of. Those not so easily understood will be detained at the Bureau for special study. This period of study may last a week, a month, six months or even longer if necessary.—HENRY H. GODDARD.

The Children's Year Weighing and Measuring Test.—During the early summer, the Children's Bureau of the United States Department of Labor, in coöperation with the Child Welfare Department of the Woman's Committee of the Council of National Defense, instituted a nation-wide Weighing and Measuring Test, as part of the Children's Year campaign in the interests of infant and child welfare. The arrangements for the test in each community were made by the local child welfare committee. Generous professional assistance and supervision were given by physicians. It was estimated that, by July 1, nearly 6,000,000 children, most of them under 6 years of age, had been weighed and measured.

The first object of the test was, taking weight and height as a rough index of physical condition, to draw the attention of parents, nurses and doctors, and communities in general to the needs of individual children whom the test might show to be under-nourished (that is, who were under the average weight for their height), or who were discovered to have serious defects or diseases. A second object was to draw the attention of the public to the need for public health nurses and for centers for infant and maternal welfare. Incidentally, the test has furnished data for a series of weights and measures for the young children of the United States. Only the records for children weighed and measured under competent medical direction are being used in the tabulations for this series which are now in process of compilation at the Chicago Office of the Children's Bureau.

The record cards used for the weighing and measuring test show, in addition to the sex, weight, height, and physical condition of the child, the race and nativity of his mother and father. A table of average weights and heights, compiled from various sources, was printed on the cards for the information of the examiners and of parents. The figures given in this table for height and weight at birth were taken from L. Emmett Holt (*Diseases of Infancy and Childhood*, 1916, p. 20) and are based on original observations. Those for boys at 3 months were furnished by Dr. Holt in a personal communication. The figures for height and weight from 6 to 48 months were taken from the Anthropometric Table compiled for the American Medical Association by F. S. Crum. They are based on the measurements of 10,423 healthy babies (5,602 boys and 4,821 girls) examined at baby health conferences in 31 states, and possibly represent measurements slightly above the average, especially in weight. The figures for height and weight from 5 to 16 years were quoted from Bowditch (8th annual report of the State Board of Health of Massachusetts, 1877, p. 275) and are based on the measurements of 23,931 Boston school children of American and foreign parentage (13,415 boys and 10,516 girls).—JULIA C. LATHROP.

Professor Manouvrier, of Paris, has recently submitted to the U. S. Army authorities what seems a very important proposal, for the practical application of certain well known anthropological principles to our armies. The gist of the proposal, which is based on the author's military experience as well as his thorough anthropological and physiological knowledge, is that as men differ considerably in the length of their lower limbs and hence in the length of their natural step, regardless of stature, the recruits should be grouped, if the highest marching efficiency of the regiments is to be obtained, by the length of their limbs rather than by the height of the body. There is a great deal of good scientific sense in this advice. No one can deny that the greatest possible marching proficiency of our soldiers, accompanied with the least possible strain and suffering, would be under all circumstances a most desirable and important acquisition. If, on the other hand, short-legged and long-legged men be placed with little discrimination into the same companies and regiments, it must follow that there will develop in the course of longer marches undue strain on a proportion of the men, which will diminish their effectiveness and may retard at vitally important moments the arrival of reinforcements, or other military evolutions.

ANTHROPOLOGICAL WORK IN RUSSIA.—In answer to the Editor's inquiry as to what if any anthropological research has been undertaken in connection with the war in Russia, the following note, which deserves to be quoted in full, has been received. The note is dated March 7, 1918, and reached the Editor's hands the 2nd day of October.

"We are sorry to inform you, that nothing has been done in the direction noted by you in your letters just now received about the intended anthropological investigation of the various contingents of the Russian army. It is true, an attempt has been made before the revolution to investigate at least the allogeneous Asiatic nations represented in the army, but unhappily it failed.

"After the revolution the attention of course has turned far away from scientific undertakings, and now everything is lost.

"Archeological researches in the trenches have been made, but only occasionally and the results are scanty.

"Organized efforts (by the Academy of Sciences) have been made through special expeditions for protecting and investigating monuments of art and science in the occupied parts of Turkey and Galicia, and that is all.

"We write you in a moment of the deepest depression in our life. All that we and our friends can wish is to make you and yours believe that all our sympathies and hopes are with Americans and their allies.

Yours very sincerely,

(signed) LEO STERNBERG,
WALDEMAR JOCHELSON."

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PHYSICAL ANTHROPOLOGY: ITS SCOPE AND AIMS; ITS
HISTORY AND PRESENT STATUS IN AMERICA

ALEŠ HRDLIČKA

C—concl. RECENT HISTORY AND PRESENT STATUS OF THE SCIENCE
IN NORTH AMERICA

WASHINGTON, D. C.

Washington, due to the location here of the Smithsonian Institution together with the National and Army Medical Museums, and of such government concerns as the Bureau of American Ethnology, the Indian Office, the Census Bureau and the Bureau of Immigration, has long offered a most favorable field for Physical Anthropology, and this field, though perhaps not always made a full use of, was not neglected in recent years.

THE ARMY MEDICAL MUSEUM

Since the transfer in 1898-1899 and 1904 of approximately 4,000 normal crania and other osteological specimens from the Army Medical Museum to the National Museum (see Part *B*), activities in Physical Anthropology in the former have ceased. The Surgeon-General's Library at the Museum, however, and the *Index Medicus* which is edited there, continue to be of great aid to students in Physical Anthropology; and helpful interest in the branch has been preserved by Dr. Lamb, pathologist of the Museum and Professor of Anatomy at the Howard University.

Born in 1843 in Philadelphia, Doctor Lamb served in various capacities through the Civil War, then graduated in medicine, and in 1868

was assigned, as Acting Assisting Surgeon, U. S. A., to duty at the Army Medical Museum, where he is to this date. He has been one of the pillars of the Anthropological Society of Washington; and has given us a number of contributions of value to Physical Anthropology. He conducted the post mortem examinations of President Garfield, Vice-President Henry Wilson, and the assassin Guiteau; has been for many years in charge of the splendid exhibits in the Army Medical Museum; and was largely instrumental in the eventual transfer of the normal anthropological material to the United States National Museum.

His anthropological bibliography follows:

- Eighth sternal rib in man. *Amer. Anthropol.*, 1889, II, 75.
 The olecranon perforation. *Amer. Anthropol.*, 1890, III, 159-174.
 Primitive trephining in Peru. *Nat. Med. Rev.*, 1895-6, IV, 28.
 Precolumbian syphilis. *Proc. Assn. Amer. Anat.*, 1897, x, 63; also *Nat. Med. Rev.*, 1897-8, VII, 234.
 Mythical monsters. *Amer. Anthropol.*, 1900, II, 277-291.
 Mummification, especially of the brain. *Amer. Anthropol.*, 1901, III, 294-307.
 Some brain weights in the negro race. *Amer. Anthropol.*, 1904, VI, 364.
 The story of the Anthropological Society of Washington. *Amer. Anthropol.*, 1906, VIII, 564-579.
 Specimens in the Army Medical Museum from prehistoric peoples. *Wash. Med. Annals*, 1912-13, 109-118.
 Obituary of Dr. Robert Fletcher. *Amer. Anthropol.*, 1912, XIV, 687.
 Case of supernumerary toe in Egyptian mummy. *Wash. Med. Annals*, 1914, XIII, 161.
 Sanitation in ancient civilizations. *Ibid.*, 335-352.
 The Army Medical Museum in American Anthropology. *Proc. XIX Internat. Cong. Americanists*, Wash., 1917, 625-632.

In connection with the Army Medical Museum a word is due also to Dr. J. L. Wortman, who in 1888, while attached as Anatomist to the Museum, was largely instrumental in preserving the human bones recovered by the Hemenway Expedition to the Southwest, and who subsequently published a painstaking study on the hyoid bones found among this material (*Amer. Anthropol.*, 1889, II, 81; *C. R. VII Cong. Internat. d'Américanistes*, Berlin, 1888; *Mem. Nat. Acad. Sc.*, 1893, VI, 203-211). Doctor Wortman is still living, but devotes his attention to paleontology and osteology of other mammals than man. One of the main problems he is occupied with is, however, the origin of the primates.

In his studies on the Indian hyoid, Doctor Wortman was assisted by the Anthropologist of the Hemenway Expedition, Dr. Herman

ten Kate, whose work in American Anthropology may perhaps best be noted in this connection.

Doctor ten Kate, a native of Holland, scholar of Broca, and now for many years living in Japan, has given us a series of valuable contributions on American anthropology, both that of the living and of the skeletal remains. He first visited this continent in 1883, under the auspices of the Société d'Anthropologie de Paris, when he studied the Iroquois, the Indians of Lower California and some of those of the Southwest. He visited the Southwest again as the Anthropologist of the Hemenway Expedition, in 1887-1888, and secured observations and measurements on several hundred of adults and children among the Pima, Papago, Maricopa, Yuma, Zuni and other Indians. After that his interest extended to the Indians of South America, where he traveled considerably and settled for a time. To some extent he is still engaged with American problems, his latest contribution to the subject dating from as late as October 1917. He has the distinction of being perhaps the last living anthropologist of note who defends the theory of a multiplicity of races on the American continent, though this is largely if not entirely due to his interpretation of the term "race." The following is a list of his contributions to North American Physical Anthropology:

- Quelques observations sur les Indiens Iroquois. *Rev. d'Anthrop.*, 1883, 2 sér., vi, 279-283.
- Les Indiens de la presque-île de la Californie et de l'Arizona. Lettre, *Bull. Soc. d'Anthrop.*, Paris, 1883, 3 sér., vi, 374-376.
- Indiens de la Sonora et de l'Arizona. Lettre, *Ibid.*, 634-637.
- Observations sur les Indiens du Nouveau Mexique et du Colorado. Lettre, *Ibid.*, 801-804.
- Indiens des Etats-Unis du Sud-Ouest. Lettre, *Ibid.*, 898-900.
- Sur quelques crânes de l'Arizona et du Nouveau Mexique. *Ibid.*, 1884, vii.
- Matériaux pour servir à l'anthropologie de la presque-île Californienne. *Bull. Soc. d'Anthrop.*, Paris, 1884, 3 sér., vii, 551-569.
- Description d'un crâne Moqui. *Arch. Neerland.*, 1885, xx.
- Reisen en onderzoekingen in Noord-Amerika. 8°, Leiden, 1885, 464 pp. (Includes measurements and observations on Indians of the southwest.)
- On an anatomical characteristic of the hyoid bone of Precolumbian Pueblo Indians. C. R. vii Cong. Internat. d'Américanistes, Berlin, 1888 (with J. L. Wortman).
- On the alleged Mongolian characteristics of the American race. A reply to Dr. Brinton. *Science*, 1888, 227-228.
- Sur la question de la pluralité et de la parenté des races in Amérique. C. R. viii Cong. Internat. d'Américanistes, Paris, 1892, 288-294.
- Somatological observations on Indians of the Southwest. *J. Am. Ethnol. & Arch.*, 1892, iii, 119-144.

Observations au sujet des "Recherches anthropologiques sur la Basse-Californie" du Dr. Rivet. *L'Anthrop.*, 1911, xxii, 37-40; *Encore l'anthropologie de la Basse-Californie*. *Ibid.*, 374-375.

Dynamometric observations among various peoples. *Am. Anthrop.*, 1916, xviii, 10-18.

Mélanges anthropologiques: Indiens d'Amérique du Nord. *L'Anthrop.*, 1917, xxviii, 369-401.

UNITED STATES NATIONAL MUSEUM, SMITHSONIAN INSTITUTION

The establishment of the Division of Physical Anthropology in the United States National Museum, 1903, has been briefly touched upon in Part B of this memoir. Since then and in close coöperation with the Bureau of American Ethnology, the National Museum has become the center of activities in this line in Washington. The credit for the establishment of the Division and in a large measure also for its progress, is due to Prof. William H. Holmes, formerly Chief of the Bureau of American Ethnology, and since 1910 Head Curator of the Department of Anthropology at the United States National Museum.

The Division, from the modest beginnings which consisted of a stack of trays and boxes of old skeletal material, some of which had never yet been unpacked, together with a few open shelves in a portion of a gallery in the old museum and one chair with one small plain table, grew until at present it embraces an office, library, exhibition room and hall, brain room, preparatory rooms, laboratory, storage and maceration room; and its activities have grown in proportion. In view of the fact that valuable anthropological material is generally and rapidly becoming scarce, the foremost care was given from the start to the gathering of such material both in America and other parts of the world, and to its preservation in the best possible form for future reference and investigation. The old collections were carefully combed over and all material that was not properly identified, of which there was a large amount, was eliminated. New forms of drawers and racks and new system of arrangement were developed, assuring the utmost practicable safety, ventilation, freedom of dust and accessibility. A fully equipped anthropometric laboratory was established for the purpose of research and instruction. The collections were extended to other important parts of the body besides the skeleton, more particularly to the brain, and the most valuable specimens in the collection were segregated as exhibits, and as special series for scientific visitors. The Division has been made freely accessible to all properly equipped students, and is being used for purposes of investigation by a steadily

increasing number of dentists, physicians, and other scientific men. In addition the Division is freely assisting, by instruction and otherwise, in anthropological investigations carried on in other parts of the country; while no small part of its function is that of furnishing anthropological information to correspondents of the Institution. There are no undergraduate courses of instruction; but laboratory facilities and other assistance are offered to postgraduates desirous to engage in anthropological investigations.

In research, the foremost attention has been and is being given to the problems of man's antiquity, particularly that on the American continent; to the racial identity, origin and derivation of the American Indian; to the anthropological problems presented by the heterogeneous population of the United States; and recently to the influences on the race of the war.

Under the auspices of the Smithsonian Institution, of various government departments, and of expositions, such as that held 1915-1916 at San Diego, Cal., numerous expeditions for the collection of anthropological data and specimens have been made to different parts of the world; an account of these is yearly given in the *Smithsonian Explorations*.

The publishing of the *American Journal of Physical Anthropology*, while not its official function, is nevertheless an outgrowth of the work of the Division.

It will perhaps be most convenient to give in this place the bibliography of the anthropological publications of the writer, curator of the Division.

Anthropological and medical-anthropological publications, by Aleš Hrdlička:

Contribution to the general pathology of the insane. (Physical examinations and measurements.) 24th Ann. Rep. Middletown St. Hom. Hospital, Middl., N. Y., 1895, 162-207.

A case of extensive traumatic brain lesion with very meagre objective symptoms. Med. Record, 1895, XLVIII, 512-514, 2 figs.

Disorders of sensibility in the insane. N.-Am. J. Homeop., 1895, x, 719-729.

Contributions to general etiology and pathology of the insane: I. Etiological relation of tuberculosis to insanity; II. Disorders of smell in the insane; III. Reflexes in the insane; IV. Investigations as to color-blindness and some psychological phenomena in the insane. Twenty-fifth Ann. Rep. Middletown St. Hom. Hospital, Middl., N. Y., 1896, 149-177. Also in Am. J. Insan., 1896, LII, 325-343.

Twenty autopsies held upon the cadavers of the insane. Twenty-fifth Ann. Rep. Middletown St. Hom. Hospital, Middl., N. Y., 1896, 179-213.

- A trial of thyroid in a few cases of insanity. *State Hospitals Bulletin*, 1896, Utica, N. Y., 1, 55-63.
- Pathological Institute of the New York State Hospitals: Department of Anthropology—Outline of its scope and exposition of the preliminary work. *State Hospitals Bull.*, 1897, 11, 1-18. Also in *Contributions of the Pathological Institute of the New York State Hospitals*, Utica, N. Y., 1898, no. 4.
- A few words about anthropometry. *Am. J. Insan.*, 1897, LIII, 521-533.
- An interesting case of pseudo-hermaphroditismus masculinus completus. *Albany Med. Annals*, 1897, xviii, 476-484. With 4 fig. (In title J. C. Carson & A. H., but whole paper by A. H.)
- The teeth in the neuropathic. *Trans. Hom. Med. Soc. St. N. Y.*, 1897, xxxii, 170-173.
- The medico-legal aspect of the case of Maria Barbella (with anthropometric data on Calabrian women). *State Hospitals Bull.*, 1897, 11, 213-299, fig. 1-19.
- Trephining in Mexico. *Am. Anthrop.* 1897, x, 389-396, 2 pl., 1 fig. (With C. Lumholtz, but all except first three paragraphs by A. H.)
- Art and "Literature" in the mentally abnormal. *Trans. Hom. Med. Soc. St. N. Y.*, 1898, xxxiii, 233-246. Also in *Am. J. Insan.*, 1899, lv, 385-404, pl. 1-6.
- Report on anthropological work in the State Institution for feeble-minded children, Syracuse, N. Y. Forty-eighth Ann. Rep. of the Institution. Published also separately by Wynkoop, Hallenbeck, Crawford Co., N. Y., and Albany, 8°, 1899, 98 pp., 2 charts, 2 fig.
- Physical differences between white and colored children. *Am. Anthrop.*, 1898, xi, 347-350.
- Dimensions of the pituitary fossa or Sella Turcica in the white and the negro races. *Arch. Neurol. & Psychopath.*, Utica., N. Y., 1898, 1, 679-698, 3 pl.
- Study of the normal tibia. *Am. Anthrop.*, 1898, xi, 307-312. Also *Proc. Ass. Am. Anat.*, 11th Sess., Wash., 1899, 61-66, 1 fig. (Paper not quite the same.)
- Report on skeletal remains of the Seri. In W J McGee's "The Seri Indians," 17th Ann. Rep., B. A. E., Wash., 1898, 140-147, fig. 6.
- An anomalous ulna: supracapital foramen. *Am. Anthrop.*, 1899, n.s., 1, 248-250, 1 pl.
- A new joint formation [Radio-humeral]. *Ibid.*, 550-551, 1 pl.
- Description of an ancient anomalous skeleton from the Valley of Mexico; with special reference to supernumerary and bicapital ribs in man. *Bull. Am. Mus. Nat. Hist.*, N. Y., 1899, xii, Art. V, 81-107, pl. I-V, fig. 1-10. Transl. in *Anales del Museo Nacional, Mex.*, vii, 75-92.
- Esquimo brain. *Proc. Am. Med.-Psychol. Ass.*, N. Y., 1899, 392-397, pl. I-V, fig. 1-2.
- The needs of American anthropologists. *Am. Naturalist*, 1899, xxxiii, 684-688.
- A further contribution to the study of the tibia, relative to its shapes. *Proc. Assn. Am. Anat.*, XII and XIII Sessions, Wash., 1900, 12-13.
- Anthropological investigations on one thousand white and colored children of both sexes, the inmates of the New York Juvenile Asylum. With additional notes on one hundred colored children of the New York Colored Orphan Asylum. Wynkoop, Hallenbeck, Crawford Co., N. Y., and Albany, 1900, 8°, 1-86, 4 charts, 12 fig.

- Arrangement and preservation of large collections of human bones for purposes of investigation. *Am. Naturalist*, 1900, xxxiv, 9-15.
- Physical and physiological observations on the Navaho. *Am. Anthrop.*, 1900, ii, 339-345.
- A bilateral division of the parietal bone in a Chimpanzee, with a special reference to the oblique sutures in the parietal. *Bull. Am. Mus. Nat. Hist.*, N. Y., 1900, xiii, 281-295, fig. 1-6.
- Contribution to the osteology of ribs. *Proc. Assn. Am. Anatom.*, 14th Ann. Sess., Wash., 1901, 61-68, fig. 1-6.
- Typical forms of shaft of long bones. *Proc. Assn. Am. Anatom.*, 14th Ann. Sess., Wash., 1901, 55-60, fig. 1-2.
- Certain racial characteristics of the base of the skull. *Science*, 1901, xiii, 309. Also *Proc. Assn. Am. Anatom.*, 15th Sess., in *Am. J. Anat.*, 1901-2, i, 508-9.
- An Eskimo brain. *Am. Anthrop.*, 1901, iii, 454-500, pl. I-IV, 2 fig. Also separately: The Knickerbocker Press, N. Y., 1901, 8°, 1-49, pl. I-IV, 2 fig.
- A painted skeleton from Northern Mexico, with notes on bone painting among the American aborigines. *Am. Anthrop.*, 1901, iii, 701-725, pl. XXV.
- The crania of Trenton, New Jersey, and their bearing upon the antiquity of man in that region. *Bull. Am. Mus. Nat. Hist.*, N. Y., 1902, xvi, Art. 3, 23-62, 3 charts, pl. I-XXII, fig. 1-4.
- Particularidades anatomicas de los craneos Otomies. *Cronica Medica Mexicana*, 1902, v, 72-75.
- New instances of complete division of the malar bone, with notes on incomplete division. *Am. Naturalist*, 1902, xxxvi, 273-294, fig. 1-15.
- Anthropological work in the Southwestern United States and Mexico. *Am. Mus. J.*, N. Y., 1902, ii, No. 7, 68-72, 1 fig.
- The Aztecs of yesterday and today. *Harpers Monthly*, N. Y., Dec., 1902, 35-42, map and 3 fig.
- The Lansing skeleton. *Am. Anthrop.*, 1903, v, 323-330, 1 fig.
- A modification in measuring cranial capacity. *Science*, 1903, xvii, 1011-1014, 1 fig.
- Divisions of the parietal bone in man and other mammals. *Bull. Am. Mus. Nat. Hist.*, N. Y., 1903, xix, Art. VIII, 231-386, 15 pl., 35 fig.
- The "Chichimecs" and their ancient culture, with notes on the Tepecanos and the ruin of La Quemada, Mexico. *Am. Anthrop.*, 1903, v, 385-440, 8 pl., 4 fig.
- Notes on the Indians of Sonora, Mexico. *Am. Anthrop.*, 1904, vi, 51-89, 7 pl.
- Anomalous articulation and fusion of the atlas with the occipital bone. *Abstr.*, *Wash. Med. Ann.*, 1904, iii, 34-35.
- Further instances of parietal division. *Am. Naturalist*, 1904, xxxvii, 301-309, fig. 1-4.
- Further instances of malar division. *Ibid.*, 361-366, fig. 1-5.
- Directions for collecting information and specimens for physical anthropology. *Bull. U. S. Nat. Mus.*, Part R, No. 39, Wash., 1904, 1-25, pl. I-VIII.
- Crow burial in Montana. *Proc. Anthrop. Soc. Wash.*, *Am. Anthrop.*, 1904, vi, 753.
- Two artificially deformed crania. *Trans. Anthrop. Soc. Wash.*, in *Am. Anthrop.*, 1904, vi, 756-758.

- Brain weight in vertebrates. *Smiths. Misc. Coll.*, Wash., 1905, XLVIII, Part 1, No. 1582, 89-112.
- Head deformation among the Klamath. *Am. Anthropol.*, 1905, VII, 360-361.
- The painting of human bones among the American aborigines. *Rep. Smiths. Inst.* for 1904, Wash., 1905, 607-617, pl. I-III.
- Notes on the San Carlos Apache. *Am. Anthropol.*, 1905, VII, 480-495, 3 pl., 7 fig.
- Diseases of the Indians, more especially of the Southwest United States and Northern Mexico. *Wash. Med. Ann.*, 1905, IV, 372-394.
- Notes on the Pima of Arizona. *Am. Anthropol.*, 1906, VIII, 39-46, 2 pl., 8 fig.
- Brains and brain preservatives. *Proc. U. S. Nat. Mus.*, 1906, XXX, 245-320b, fig. 1-27.
- Contribution to the physical anthropology of California. *Univ. of Cal. Publications American Archeology and Ethnology*, 1906, IV, No. 2, 49-64, 5 tables, map, pl. 1-10.
- Anatomical observations on a collection of orang skulls from Western Borneo; with a bibliography. *Proc. U. S. Nat. Mus.*, 1906, XXXI, 539-568, fig. 1-8.
- Measurements of the crainal fossae. *Proc. U. S. Nat. Mus.*, 1907, XXXII, 177-232, 2 pl.
- Beauty among the American Indians. *Boas Anniversary Volume*, N. Y., 1906, 38-42, 3 pl.
- Handbook of American Indians North of Mexico. *Bull. XXX, B. A. E.*, Wash., 1907-1910 (and subsequent editions). Articles: Part I—Anatomy, 53-56; Artificial head deformation, 96-97; Health and disease (in Indians), 540-541; and medicine and medicine-men, 836-839. Part II—Physiology, 238-240; Scarification, 484-485.
- Physical anthropology and its aims. *Science*, 1908, XXVIII, No. 706, 33-43. Also *Anat. Rec.*, 1908, II, 182-195. Revised ed. in *Am. J. Phys. Anthropol.*, 1918, I, 1-23.
- Skeletal remains suggesting or attributed to Early Man in North America. *Bull. 33, B. A. E.*, Wash., 1907, 1-113, pl. I-XXI, fig. 1-16.
- Report on a collection of crania from Arkansas. *J. Ac. Nat. Sc.*, Phila., 1908, XIII, 558-563.
- Contribution to the knowledge of tuberculosis in the Indian. *The Southern Workman*, 1908, XXXVII, 626-634. Also, in *Trans. VII Internat. Cong. on Tuberculosis. Abstr. in Charities and the Commons*, N. Y., 1908, XXI.
- New examples of American Indian skulls with low forehead. *Proc. U. S. Nat. Mus.*, 1908, XXXV, 171-175, 1 pl.
- Otis Tufton Mason. *Science*, 1908, XXVIII, 746-748.
- Physiological and medical observations among the Indians of Southwestern United States and Northern Mexico. *Bull. 34, B. A. E.*, Wash., 1908, I-IX, 1-460, pl. I-XXVIII, fig. 1-2.
- Tuberculosis among certain Indian tribes of the United States. *Bull. 42, B. A. E.*, Wash., 1909, I-VII, 1-48, pl. I-XXII.
- Report on the skeletal remains (from Eastern Nebraska). *Am. Anthropol.*, 1909, XI, 79-84, fig. 8. (With "Excavation of Earth-Lodge ruins in Eastern Nebraska," by Robert F. Gilder).
- Note sur la variation morphologique des Egyptiens depuis les temps préhistoriques ou prédynastic. *Bull. et Mém. Soc. d'Anthropol.*, Paris, 1909, X, 143-144.

- The stature of the Indians of the Southwest and of Northern Mexico. Putnam Anniversary Volume, Cedar Rapids, Ia., 1909, 405-426.
- Report on skeletal material from Missouri mounds, collected in 1906-1907 by Mr. Gerard Fowke. In Bull. 37, B. A. E., Wash., 1910, 103-112.
- Report on an additional collection of skeletal remains from Arkansas and Louisiana. J. Ac. Sc., Phila., 1909, xiv, 173-240, 9 fig.
- Contribution to the anthropology of Central and Smith Sound Eskimo. Anthropol. Papers, Am. Mus. Nat. Hist., N. Y. 1910, v, part II, 175-280, 15 pl.
- Report on the Trenton femur and parietal. In "The archeology of the Delaware Valley," by E. Volk, Papers of the Peabody Mus., Cambridge, Mass., 1911, 244-247.
- Some results of recent anthropological exploration in Peru. Smiths. Misc. Coll., 1911, LVI, No. 16, 1-16, 4 pl.
- * Human dentition and teeth from the evolutionary and racial standpoint. Dominion Dent. J., Toronto, 1911, 403-422.
- The natives of Kharga Oasis, Egypt. Smiths. Misc. Coll., 1912, LIX, No. 1, I-VI, 1-118, pl. I-XXXVIII.
- The problem of unity or plurality and the probable place of origin of the American aborigines. Symposium, presented before Sect. H., A. A. A. S., 1911. Parts History and Physical Anthropology. Am. Anthropol., 1912, xiv, 5-12. Also Trans. XVIII Internat. Cong. Americanists, London, 1913, 57-62.
- Early Man in South America. With the collaboration of W. H. Holmes, Bailey Willis, F. E. Wright and C. N. Fenner. Bull. 52, B. A. E., Wash., 1912, 1-xv, 1-405, pl. I-LXVIII, fig. 1-50.
- An ancient sepulchre at San Juan Teotihuacan, with anthropological notes on the Teotihuacan people. Reseña II Ses. XVII Congr. Internac. Americanistas. Mex., 1912, Append., 1-7.
- Early Man in America. Am. J. Sc., 1912, 543-554; also Trans. XVIII Internat. Cong. Americanists, London, 1913, 10-21.
- Early Man and his "Precursors" in South America. Anat. Anzeiger, 1913, XLIII, 1-14.
- Remains in Eastern Asia of the race that peopled America. Smiths. Misc. Coll., Wash., 1912, LX, No. 16, 1-5, 3 pl.; also C. R. XIV Congr. Internat. d'Anthropol. et d'Archeol. préhist., Genève, 1913, 409-414. Also J. Hered., Wash., 1915, vi, 79-91, Transl. in Russian in Trudy Troickosavsko-Kiachtinskago Otd. Imp. Russ. Geog. Obšč., 1912, xv, 70-75.
- Report on skeletal remains from a mound on Haley Place, near Red river, Miller Co., Ark. J. Ac. Nat. Sc., Phila., 1912, xiv, 639-640.
- Artificial deformations of the human skull. With especial reference to America. Abstr. in Actas XVII Cong. Internac. Americanistas, Buenos Aires, 1913, 147-149.
- A report on a collection of crania and bones from Sorrel Bayou, Iberville Parish, Louisiana. J. Ac. Nat. Sc., Phila., 1913, xvi, 95-99.
- Anthropological work in Peru in 1913. With notes on the pathology of the ancient Peruvians. Smiths. Misc. Coll., Wash., 1914, LXI, No. 18, I-VI, 1-69, 26 pl., 3 fig.
- Report on two crania from Saline Creek. In Bushnell, D. I., Jr., Archeol. Investigations in Ste. Genevieve Co., Mo., Proc. U. S. Nat. Mus., Wash., 1914, XLVI, 656.

- The most ancient skeletal remains of man. *Smiths. Rep. for 1913*, (Wash. 1914), 491-552, pl. 1-41. Second rev. edit., *Smiths. publ. 2300*, 8°, Wash., 1916, 1-63, 40 pl., 12 fig.
- Physical anthropology in America: History. *Am. Anthrop.*, 1914, xvi, 508-554; revised and suppl. ed. in *Am. J. Phys. Anthrop.*, 1918, i, 133-182.
- Descriptive catalog of the section of physical anthropology, Panama-California Exposition. 12mo., San Diego, Cal., Dec., 1914, 14 pp.
- Some recent anthropological explorations. *Proc. Nat. Ac. Sc.*, 1915, i, 235-238.
- An exhibit in physical anthropology. *Proc. Nat. Ac. Sc.*, 1915, i, 407-410.
- Study of Old Americans. *J. Hered.*, 1914, v, 509. Also, *The Old American stock. Magaz. Daughters American Revolution*, Sept., 1915, 168-171.
- Evolution of man in the light of recent discoveries and in relation to medicine. *Abstr.*, *Wash. Med. Annals*, 1915, xiv, 4 pp.
- Brief notes on recent anthropological explorations under the auspices of the Smithsonian Institution and the U. S. National Museum. *Proc. Nat. Ac. Sc.*, 1916, ii, 32-37.
- Physical anthropology of the Lenape or Delawares and of the Eastern Indians in general. *Bull. 62, B. A. E.*, Wash., 1916, 1-130, map, 29 pl. Also in *Contributions Mus. Am. Indian*, N. Y., 1916, iii.
- The normal dental arch. *Dental Cosmos*, 1916, LVIII, 1029-1032, 1059-1064.
- Goiter among the Indians along the Missouri. *Science*, 1916, XLIV, 203-204.
- The brain collection of the U. S. National Museum. *Science*, 1916, XLIV, 739.
- Anthropology of the Chippewa. *Holmes Anniversary Volume*, Wash., 1916, 198-227, 13 pl.
- The Indian Service. *Rep. 34, Mohonk Conf.*, N. Y., 1916, 26-33.
- Conditions among Indians which call for amelioration. *Rep. 34, Mohonk Conf.*, N. Y., 1916, 65-69.
- The genesis of the American Indian. *Trans. XIX Internat. Cong. Americanists*, Wash., 1917, 559-568.
- The old white Americans. *Trans. XIX Internat. Cong. Americanists*, Wash., 1917, 582-601. *Abstr. with new illust. in J. Hered.*, 1917, viii, 99-105.
- Secretary's Report of the Congress. *Trans. XIX Internat. Cong. Americanists*, Wash., 1917, I-LVIII.
- Preliminary report on finds of supposedly ancient human remains at Vero, Florida. *J. Geol.*, 1917, xxv, 43-51.
- Bohemia and the Czechs. *Nat. Geogr. Mag.*, Feb. 1917, xxxi, 163-187, 25 illust.
- Suggestions relating to the New National Army by the Anthropology Committee of the National Research Council. *Proc. Nat. Ac. Sc.*, 1917, iii, 526-528.
- The vanishing Indian. *Science*, 1917, XLVI, 266-267.
- Transpacific migrations. *Man*, 1917, xvii, 29-30.
- Recent discoveries attributed to Early Man in America. *Bull. 66, B. A. E.*, Wash., 1918, 1-67, 14 pl., 8 fig.
- Physical anthropology: Recent history and present state in North America (with bibliographies). *Am. J. Phys. Anthrop.*, 1918, i, Nos. 3 and 4.
- Anthropological studies on Old American families. Exploration and field-work of the *Smiths. Inst.* in 1917. *Smiths. Misc. Coll.*, 1918, LXVIII, 49-55, 6 illust. *The vanishing Indian. Ibid.*, 55-60, 7 illust.

Prof. Wm. H. Holmes, though essentially archeologist, has nevertheless always been keenly interested in Physical Anthropology and has published, both in and outside of his connection with the United States National Museum, a number of papers which have more or less direct relation to our branch of research and thought. They bear especially on the question of man's antiquity on this continent. They are:

- Are there traces of glacial man in the Trenton gravels? *J. Geol., Chic.*, 1893, I, 15-37.
- Traces of glacial man in Ohio. *Ibid.*, 147-163.
- Vestiges of early man in Minnesota. *Am. Geol., Minneapolis*, 1893, XI, 219-240.
- Vestiges of early man in Minnesota. *The Archeol., Waterloo, Ind.*, 1894, II, 65-79.
- Preservation and decorative features of Papuan crania. *Publ. Field Columbian Mus., Anthropol. series, Chicago*, 1897, II, 41-48.
- Primitive man in the Delaware valley. *Proc. 46th Meet. A. A. A. S. (Detroit, 1897), Salem*, 1898, 364-370.
- Preliminary revision of the evidence relating to auriferous gravel man in California. *Am. Anthropol.*, 1899, n. s., I, 107-121, 614-645.
- Review of the evidence relating to auriferous gravel man in California. *Ann. Rep. Smiths. Inst. for 1899, Wash.*, 1901, 419-472.
- Sketch of the origin, development, and probable destiny of the races of men. *Am. Anthropol.*, 1902, IV, 369-391.
- Fossil human remains found near Lansing, Kansas. *Am. Anthropol.*, 1902, IV, 743-752.
- Fossil human remains found near Lansing, Kansas. *Ann. Rep. Smiths. Inst. for 1902, Wash.*, 1903, 455-462.
- Organization of the Committee on Anthropology of the National Research Council, and its activities for year 1917. *Am. J. Phys. Anthropol., Wash.*, 1918, I, 77-90.
- On the antiquity of man in America. *Science*, 1918, XLVII, 561-562.

THE BUREAU OF AMERICAN ETHNOLOGY

The Bureau of Ethnology continues to render valuable assistance to Physical Anthropology on all occasions. It has not only facilitated the publication of several memoirs in this branch, but has also assisted materially in securing additional collections of skeletal material and in furthering somatological work wherever feasible. In Professor Holmes, Mr. F. W. Hodge, and Dr. Walter J. Fewkes, its past and present chiefs, Physical Anthropology has had and continues to have the best friends and promoters. The Bureau's publications in somatology are given in other connections.

NATIONAL ZOÖLOGICAL PARK

Within the last fifteen years the National Zoological Park, first under the direction of Dr. Frank Baker and now of Mr. N. Hollister, has rendered considerable assistance to anthropology at the Smithsonian Institution by facilitating a prompt transmission of dead animals, with necessary data, for the purpose of brain extraction.

OTHER GOVERNMENT INSTITUTIONS IN WASHINGTON

Public Health Service. Bureau of Immigration. The Immigration Commission.—Under the coöperation of the Public Health Service, which furnishes the medical staffs to the Immigration Service, anthropometric investigations have recently been carried on through several seasons on the various nationalities of immigrants reaching this country. These investigations, under the direction of the writer, are not yet completed. Special credit for the facilitation of this most desirable work is due to Dr. Rupert Blue, Surgeon General of the Public Health Service.

The Immigration Commission was a special body appointed in 1907 by the United States Congress for study of the various problems connected with immigration. Under the auspices of this Commission a very creditable *Dictionary of European and other Immigrant Races or Peoples* was compiled and published some years ago (Senate Doc. No. 662, 8°, Wash., 1910). It was the work of Dr. Daniel Folkmar (assisted by Dr. Eleanora Folkmar), who until recently was connected with the Bureau of Census. Doctor Folkmar was formerly active in anthropology at Manila, P. I., and in connection with his work there published an *Album on Philippine Tribes*, 4°, Manila, 1904, with 80 plates and individual measurements. The Immigration Commission published also a number of other volumes, several of which through the demographic data which they contain are of some interest to Physical Anthropology.

The United States Bureau of Census, while not concerned directly with anthropological investigations, is furnishing our science with invaluable documents on the population. The racial data and comparisons which it has published in such useful form within the last years are especially helpful (See "Circular of Information Concerning Census Publication," Bur. of Census, 8°, Wash., 1914, 91 pp.).

THE UNITED STATES BUREAU OF INDIAN AFFAIRS

The Bureau of Indian Affairs, while not engaging directly in anthropological work, has always been most favorable and helpful to explorers and workers in all branches of anthropology. Moreover its Annual Reports are a mine of statistical and other information on the Indians; and under its auspices or directly by the Bureau there have been conducted, beginning in 1907 with the writer's study on tuberculosis, investigations on diseases among the Indians, the results of which and the practical applications of these results are of decided concern to physical anthropology.

THE CHILDREN'S BUREAU

The Children's Bureau was established under the Department of Labor, in Washington, in 1912, and has since been ably directed by Miss Julia C. Lathrop. It employs a number of lady physicians and other investigators who devote most of their time to field work. The chief aim of the Bureau is to "investigate and report upon all matters pertaining to the welfare of children," but the researches which it carries on and which are rapidly increasing, are of very close interest to Physical Anthropology. It is hoped, moreover, that these studies may soon extend to such subjects as the growth and the general development of the American child under radically different conditions of derivation, environment, occupation and social position. The Bureau has already issued a series of very creditable publications dealing with maternal and infant mortality, statistics of children, and related subjects.

THE NATIONAL RESEARCH COUNCIL

The National Research Council was organized in Washington during 1916-1917, under Government auspices, and in close coöperation with the National Academy of Sciences, the American Association for the Advancement of Science and other important societies. The object of the council is to advise and assist the Government in all matters where science can be of help under the present critical conditions; and its original plan included the selection of a representative committee from each branch of science that could be useful in connection with the war. It is gratifying to state that one of the first committees brought into existence was that on Anthropology. The aspirations and activities of this Committee have been described in the first number of this

*Journal*¹ and need not be repeated. It will suffice to say that at the end of the first year of its existence the condition of this Committee and its prospects of accomplishing good work were quite propitious. There were many material difficulties in the way, but possibly they would have been surmounted.

Due to unfortunate circumstances, the current year has been a much less favorable one for the Committee. In many ways it has been disappointing. This is, however, not the time or place to enter into details about these conditions; but some day the history of the Committee will make instructive though perhaps not very cheerful reading.

ADDITIONAL

In connection with various other government departments there arose in Washington within the last few decades a number of men who, though not regular workers in Physical Anthropology, have through their writings and otherwise contributed to the progress of the branch. Among those of this class who are still with us, the first mention is due to Doctor Yarrow.

Dr. H. C. Yarrow assisted Severance in his study of human crania and skeletons from the southwest (Vol. VII, U. S. Geog. Surv. W. 100th Merid., Wash., 1879, 391), and gave us a number of papers of interest to somatology, the most valuable of which is that on burial customs of the North American Indians. They are:

List of skeletons and crania. Army Med. Mus., Wash., 8°, 1876, 52 pp.

On the explorations of some Indian graves in Utah. Field and Forrest, 1877, II, 185-188.

Notes on Indian graves in Utah. Ibid., 1877, II, 207.

Exploration of ancient aboriginal graves in New Mexico. Ibid., 1877, II, 8-10.

A further contribution to the study of the mortuary customs of the North American Indians. First Ann. Rep. B. A. E., Wash., 1881, 89-203.

Still another anthropological investigator of Washington was *Dr. Arthur MacDonald*. Connected (1891-1903) with the United States Bureau of Education as "Specialist in Education as Preventive of Pauperism and Crime," he devoted his attention in a measure to the study of children, but his main lines of interest were always criminology and the abnormal classes of the population. He published numerous contributions to these subjects, the more noteworthy of which are:

¹ See "Organization of the Committee on Anthropology of the National Research Council, and its Activities for year 1917" by William H. Holmes, *Am. J. Phys. Anthropol.*, 1918, I, 77-90.

Experimental study of children. Wash., Govt. Print. Office, 8°, 1899, 406 pp.
Statistics of crime, suicide and insanity. A Senate document, Wash., Govt. Printing Office, 8°, 1903, 195 pp.
Juvenile crime and reformation. Wash., Govt. Printing Office, 8°, 1908, 339 pp.

Doctor MacDonald's work unfortunately has remained in a large measure individualistic and has failed to bring the desired results. Since 1911 he is again connected with the Bureau of Education, but not in scientific capacity. The anthropometric laboratory which he was instrumental in establishing at the Bureau has been abandoned.

Under the auspices of the United States Bureau of Education were also published two memoirs on anthropometric studies of children by outside investigators—the first, by Dr. F. Boas, on "The Growth of Toronto Children" (*Ann. Rep. Comm. Educ.* for 1896–1897, Wash. 1898, 1541–1599) and the second, by F. Boas and Clark Wissler, on "Statistics of Growth" (*Ibid.*, for 1904, Wash. 1905, 25–132).

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

This section would be incomplete without an additional mention of the services to somatology and American anthropology in general, of the Anthropological Society of Washington. Established in 1879, this Society has been active to this day without interruption. The object of the Society, as stated in the original constitution, was "to encourage the study of the natural history of man, especially with reference to America," and its sections included in the first place Somatology (for details see "The Story of the Anthropological Society of Washington," by D. C. Lamb, *Am. Anthropol.*, 1906, n. s. VIII, 564–579). It was under the auspices of this Society that the *American Anthropologist* was established, and under its auspices, also, were given the series of "Saturday lectures" on Anthropology at the United States National Museum. Since 1916 the program of the Society at its bi-weekly meetings has been devoted essentially to war anthropology.

Between 1885 and 1899 there existed in Washington also a Women's Anthropological Society, one of whose members, Dr. Clara Bliss Hinds, left us an interesting contribution on "Child Growth," which in 1886 was published by the Society (8°, 8 pp.).

CENTRAL AND WESTERN STATES

In the central and western states, where the development of indigenous research is of more recent date, physical anthropology, as quite

natural, has not thus far found as favorable a culture-medium as in the east. But there are several foci where the prospects are promising for the future.

THE WESTERN RESERVE UNIVERSITY, CLEVELAND, OHIO

The Anatomical Laboratory at the Medical School of the University has since 1912 been in charge of Prof. T. Wingate Todd, who as far as his other strenuous duties permit, has been actively interested in anthropology. He includes regularly a course of instruction in Physical Anthropology with his anatomical lectures, has made creditable collections in this line and published the following anthropological papers:

- The dentition of the apes, etc. *Cleveland Med. J.*, 1914, XIII, 157-167.
 Early types of man. *Ibid.*, 307-315.
 Neanderthal man. *Ibid.*, 375-384.
 The ancestry of *Homo Sapiens*. *Ibid.*, 460-469.
 Paleolithic giants and dwarfs. *Ibid.*, 533-539.
 The story of the tombs. *Western Reserve Bull.*, 1914, XVI.
 L'apophyse transverse de la 7^e vertèbre cervicale. *Bull. et Mém. Soc. d'Anthrop.*, Paris, 1914, V, 282-294.
 (With B. G. Dupre)
 A transitional type of cervical rib. *Anat. Rec.*, 1901, VIII, 313-324.
 Geological evidence of man's antiquity. *Cleveland Med. J.*, 1915, XIV, 24-30.
 The teeth of the primitive man. *Ibid.*, 253-264.
 The romance of teeth. *Western Reserve Bull.*, 1915, XVII.
 Report on skeletons of Westenhaver Mound. *Ohio Arch. and Hist. Quart.*, 1917, XXVI, 238-256.

MUSEUM OF THE OHIO STATE ARCHAEOLOGICAL SOCIETY, COLUMBUS
OHIO

The Department of Anthropology of the Ohio State Archeological Society, founded in 1885, is since 1898 under the efficient curatorship of Mr. W. C. Mills. While essentially a department of archeology, it has been of service to Physical Anthropology through careful collection of skeletal material from the Ohio mounds. A report on some of these remains was recently published by Prof. T. Wingate Todd, in Mills' *Explorations of the Westenhaver Mound* (see above). The excellent publications of Mr. Mills, gathered in *Certain Mounds and Village Sites in Ohio*, 3 vol., 8°, Columbus, 1902-1918, contain also various references and illustrations relating to the skeletal remains discovered

in the excavations. A collaborator of Mr. Mills, Mr. H. C. Shetrone, has recently given us a good book on *The Indian of Ohio*, in which he presents a sensible view of the "mound-builder" question.

FIELD MUSEUM OF NATURAL HISTORY, CHICAGO

In 1891, in preparation for the World's Columbian Exposition at Chicago, there was established, as already mentioned in another connection, a Department of Anthropology, under the direction of Prof. F. W. Putnam. The broad and ambitious plans of the Department contemplated the securing of extensive archeological and ethnological collections, and at the same time an initiation of a comprehensive research in Physical Anthropology. Dr. F. Boas was placed in charge of the somatological investigations, which were carried on by a corps of students trained for the occasion, and the work extended eventually to many of the native tribes, as well as to the school-children of Toronto (Canada) and Oakland (California). The object was an extensive anthropometric survey of the tribes, and an advance, as far as possible, of studies on the development of the child in different parts of this country. The work on the tribes was practically an extension of that carried on by Doctor Boas and associates during several preceding years on the northwestern tribes of Canada; while the investigations on the children were to supplement the auspicious beginnings made in that line at Boston and Worcester.

In 1892 Dr. G. M. West became associated with the Department as Assistant in Physical Anthropology; and it was partly under his supervision that the extensive series of measurements were obtained on school children, as well as on the Indians. This field work engaged some fifty students, mostly from the Harvard Medical School, and extended to tribes from Alaska and Canada to Mexico. Important abstracts of the results were later published by Doctor Boas. (See his bibliography, p. 292f.). An anthropometric laboratory and instructive somatological exhibits were also arranged for the Exposition.

Besides the anthropometric data, the just mentioned field workers brought together considerable osteological material, to which were added a series of crania collected in previous years by Doctor Boas himself; and when the Exposition closed, to be succeeded by the Field Columbian Museum (now Field Museum of Natural History), these gatherings together with the anthropological exhibits and equipment, became the foundation of the section of Physical Anthropology at the

Museum.² Dr. G. M. West acted for a time as the Curator of the section.

In 1895, a position of Assistant Curator in charge of Physical Anthropology at the Field Museum was given to Dr. George A. Dorsey. Additional anthropometric work was carried on the living Indians as well as on their skeletal remains, numerous casts of racial types were made, and more osteological material was collected. In 1897 an interesting exhibit showing variations in the human skeleton was arranged, filling twenty-six cases.

In 1898 Doctor Dorsey became Curator of the Department of Anthropology at the Field Museum, which position he held until 1915. Between 1898 and 1913 he served also as Professor of Comparative Anatomy at the Northwestern University Dental School; and between 1905-1908 as assistant professor and from 1908-1915 as Associate Professor in Anthropology at the University of Chicago.³

While active in Physical Anthropology Doctor Dorsey published numerous contributions to that science, a list of which is appended:

Crania from the necropolis of Ancon, Peru. *Proc. A. A. A. S.*, 1894, 358-369.
The lumbar curve in some American races. *Bull. Essex Inst.*, Salem, 1895, xxvii, 53-73.

History of the study of anthropology at Harvard University. *Denison Quarterly*, 1896, iv, 77-97.

Photograph and skeleton of a native Australian. *Bull. Essex Inst.*, 1896, xxviii, 57-69.

A Maori skull with double left parietal bone. *Chic. Med. Record*, 1897, xii, (repr. 4 pp).

Notes on the numerical variations of the teeth in fifteen Peruvian skulls. *Dental Cosmos*, 1897, xxxix, (repr. 3 pp).

Numerical variations in the molar teeth of fifteen New Guinea crania. *Dent. Rev.*, Chic., 1897, xi, (repr. 7 pp).

A Peruvian cranium with suppressed upper lateral incisors. *Dental Cosmos*, 1897, xxxix, (repr. 3 pp).

Physical anthropology. *Science*, 1897, vi, 109-120. (a, Scope; b, Problem; c, Museum exhibit; d, Importance.)

A rare form of occipito-atlantal articulation. *Bost. Med. & Surg. J.*, 1897, cxxxvii, (repr. 7 pp).

² For details see *An Historical and Descriptive Account of the Field Columbian Museum*, Publ. I (Vol. 1, No. 1), of the Museum, 8°, Chicago, 1894, 90 pp.; and Dorsey, Geo. A. *The Department of Anthropology of the Field Columbian Museum*, *Am. Anthropol.*, 1900, n. s. II, 247-265.

³ In 1915, regrettably, he gave up all these positions, to devote himself to travel, journalism, and motion pictures of primitive peoples. Recently he has been commissioned in the Intelligence Service of the United States Army.

- A sexual study of the size of the articular surfaces of the long bones in aboriginal American skeletons. *Bost. Med. & Surg. J.*, 1897, cxxxvii, (repr. 12 pp).
Wormian bones in artificial deformed Kwakiutl crania. *Am. Anthropol.*, 1897, x, 169-173.
The long bones of Kwakiutl and Salish Indians. *Am. Anthropol.*, 1897, x, 174-182.
Observations on a collection of Papuan crania. *Anthrop. Series, Field Columbian Mus.*, Aug. 1897, ii, No. 1, 1-48.
Observations on the scapulae of Northwest coast Indians. *Am. Natur.*, 1897, xxxi, 736-745.
A bibliography of the anthropology of Peru. *Field Columbian Mus. Publ.* 23, Chicago, 1898, 55-206.
The Department of Anthropology of the Field Columbian Museum. A review of 6 years. *Am. Anthropol.*, 1900, ii, 247-265.
Recent progress in Anthropology at the Field Columbian Museum. *Ibid.*, 1901, iii, 737-750.

At present, the section of Physical Anthropology at the Field Museum is in charge of Dr. F. C. Cole. Doctor Cole, together with the late Dr. Wm. Jones, carried out some years ago, in connection with the Cummings Expedition, considerable anthropometric work on the natives of the Philippines. The records, extending to more than 2,000 living Filipinos, are being prepared for publication. We also owe to Doctor Cole a report on the "Distribution of the Non-Christian Tribes of Northwestern Luzon," *Am. Anthropol.*, 1909, xi, 329-347; and a memoir on "The Wild Tribes of Davao District, Mindanao," *Anthropological series, Field Mus. Nat. Hist.*, 1913, xii, No. 2, 49-203.

The twenty-nine cases of exhibits relating to Physical Anthropology now in the Field Museum, contain material illustrating the methods and purposes of work in this branch, crania showing differences in race, sex, and age, skeletal variations, and some pathological specimens. The stored collections comprise several hundred crania and skeletons, which will be noted more especially on another occasion.

The Department of Anthropology at the Field Museum is now under the curatorship of Dr. Berthold Laufer, who though principally an ethnologist and sinologue, is a warm friend of Physical Anthropology; and when the new building of the Museum now under construction is completed, affording chance for more extensive exhibits as well as laboratory room and proper storage with possibility of expansion, the development of the section of Physical Anthropology will doubtless proceed with a renewed vigor.

THE UNIVERSITY OF CHICAGO

Some attention has been given to Physical Anthropology at the University of Chicago since its opening in 1892. Two courses, elementary and advanced, were offered in this branch by Frederick Starr, Assistant Professor of Anthropology at the University 1892-1895, and Associate Professor of the branch as well as Curator in the Walker Museum of the University since 1895. Both courses have been given until recently. Between 1893 and 1895 Professor Starr was assisted by Dr. G. M. West, who was appointed a Docent in Anthropology at the University and gave particular attention to somatology.

In 1905 a second Assistant Professor of Anthropology appears at the University in Dr. Geo. A. Dorsey, and in 1908 he also is named Associate Professor. The instruction in Physical Anthropology was relegated to him and continued until 1915, since when the courses have again been in charge of Professor Starr.

Professor Starr's main published contribution to Physical Anthropology is the "Physical Characters of the Indians of Southern Mexico" (*The Decennial Publ. Univ. Chicago*, 4°, 1902, iv, 59 pp.), in which he gives measurements on a number of tribes of the Mexican natives. But items of anthropological interest are also found in his "Ethnographic Notes from the Congo Free States," *Proc. Davenport Acad. Nat. Sc.*, 1909; xii, 95-222; and in his Notes upon the Ethnography of Southern Mexico, *Ibid.*, 1899-1903, viii-ix.

Doctor Dorsey, after leaving the Field Museum, has also severed his connection with the University.

MILWAUKEE, WISCONSIN

As early as 1881 a large series of measurements on school children were made at Milwaukee, under the direction of George W. Peckham, teacher of biology in the Milwaukee high school, and the results were published in the *Sixth and Seventh Annual Reports of the State Board of Health of Wisconsin*, Madison, 1882, 28-73, 12 charts; 1883, 185-189). Regrettably this very creditable effort remained, so far as Milwaukee and Wisconsin are concerned, quite isolated.

ST. LOUIS, MISSOURI

In 1892 Dr. W. Townsend Porter of St. Louis with his assistants measured not less than 33,500 boys and girls in the public schools of

that city. The main object of these measurements were to determine the relations between physical and mental development of the children, and the work resulted in the following publications by Doctor Porter:

The physical basis of precocity and dullness. *Trans. Ac. Sc. St. Louis*, 1893, vi, No. 7.

The relation between the growth of children and their deviation from the physical type of their sex and age. *Ibid.*, No. 10.

Untersuchungen der Schulkinder in Bezug auf die physischen Grundlagen ihrer geistigen Entwicklung. *Verhandl. der Berl. anthropol. Ges., Sitz. Juli 15, 1893*, 337-354.

This important effort remained also isolated.

THE WASHINGTON UNIVERSITY MEDICAL SCHOOL, ST. LOUIS, MISSOURI

The Anatomical Department of this school is in charge of Prof. R. J. Terry, who is actively interested in Physical Anthropology. A brief course on Anthropology is included in the University subjects giving credit for higher degrees, and "facts of Physical Anthropology and lines of investigation have always been discussed in the lectures and laboratory course for medical students" (letter from Professor Terry). The library of the Department includes current and other anthropological literature and, mainly due to the efforts of Professor Terry, there are now in the Department important anthropological collections. Dr. Chas. Danforth, a member of the staff of the Department, has recently paid considerable attention to anthropological problems. In dissection a particular care is given to variations.

Publications of anthropological bearing from the Department are as follows:

TERRY (R. J.)—Rudimentary clavicles and other abnormalities of the skeleton of a white woman. *J. Anat. & Physiol.*, 1899, xxxiii, 413-422.

BARTLETT (WILLARD)—A contribution to the surgical anatomy of the middle cranial fossa. *Annals of Surg.*, 1902.

TERRY (R. J.) AND NATHANIEL ALLISON—Tuberculosis of the skeleton. *Am. J. Orthop. Surg.*, 1906-1907, iv, 398-408.

TERRY (R. J.)—Observations on the development of the mammalian vomer. *Anat. Record*, 1909, iii, 525-529.

DANFORTH (C. H.)—Some notes on a family with hereditary congenital cataract. *Am. J. Ophth.*, 1916.

DANFORTH (C. H.)—The inheritance of congenital cataract. *Am. Naturalist*, 1916, i, 442-448.

DANFORTH (C. H.)—Some aspects of the study of hereditary eye defects. *Am. J. Ophth.*, March, 1916, repr. 3-8.

DANFORTH (C. H.)—Is twinning hereditary? *J. Hered.*, 1916, vii, 195-202.

UNIVERSITY OF MINNESOTA, MINNEAPOLIS

In 1906 the Department of Sociology at the University was renamed "The Department of Sociology and Anthropology," and Dr. Albert E. Jenks, a well known anthropologist, was added to the Department. Doctor Jenks was formerly connected with the Bureau of American Ethnology (1901-1902), and served as Assistant Chief of the Bureau of Non-Christian Tribes, Manila, P. I. (1902), and as Chief of the Ethnological Survey, P. I. (1903-1905). In 1907 Doctor Jenks' title was changed to that of Professor of Anthropology. After the death of Doctor Smith, head of the Department, the latter was enlarged and reorganized by the introduction of practical social service courses, and Professor Jenks was made Chairman of the Department.

An instructional course entitled Physical Anthropology, largely a lecture course for a single semester each year, was introduced in the University year 1907-1908. A "Seminar in Anthropology" has been given since 1910, usually each semester, confined generally to subjects in the field of Physical Anthropology and to laboratory methods. There is a modest collection of racial skeletal material, hair, and casts.

Professor Jenks' publications of more direct interest to physical anthropology are as follows:

The Bontoc Igorot. Ethnol. Surv. Publ., Manila, 1905, 1, 266 pp.

The people of Minnesota. Papers and Proc. Minn. Ac. Social Sc., 11, 1908. Published also by Northfield News, 1909, 198-213.

Bulu knowledge of the gorilla and chimpanzee. Am. Anthropol., 1911, XIII, 56-64.

Ethnic census of Minneapolis. (Amalgamation study.) Am. J. Sociol., May, 1912, XVII, 776-782.

Science of anthropology in the Western Hemisphere and the Pacific Islands.

In Reports upon the present condition and future needs of the science of anthropology. Carnegie Inst. of Wash., 1913, 29-59.

A Piebald family of White Americans. Am. Anthropol., 1914, XVI, 221-237.

The legal status of Negro-White amalgamation in the United States. Am. J. Sociol., 1916, XXI, 666-679.

The failure and revival of the process of pigmentation in the human skin. Proc. Nat. Ac. Sc., 1916, 11, 164-167.

Spotted asses. J. Hered., 1916, VII, 165-168.

Indian-White amalgamation. An Anthropometric study. Studies in the Social Sciences, Univ. of Minn., March, 1916, No. 6, 24 pp.

Pitted ear lobes of congenital origin. J. Hered., 1916, VII, 553-554.

The "Half-breed" as an ascendant. In Papers and Proc. Ann. Meet. Am. Sociol. Soc., 1917, 7 pp.

UNIVERSITY OF CALIFORNIA

The Department of Anthropology at the University of California begun in 1899 with a series of important expeditions, but was not formally organized until 1901, when Dr. A. L. Kroeber and Dr. P. E. Goddard were appointed to positions in connection with the Department and when plans for a museum were initiated. It received a great impetus in 1903, through the appointment of Prof. F. W. Putnam as Professor of Anthropology at the University and as Curator of its new Anthropological Museum, positions which he occupied until 1909, dividing his time between California and Harvard. One of the most notable events of his administration from the standpoint of Physical Anthropology, was the active prosecution of the Hearst Egyptian Expedition, under Dr. Geo. A. Reisner, which resulted in the acquisition of a great and precious collection of pre-dynastic and early dynastic skeletal material from the Nile valley, now partly at the Museum of the University of California and partly at the Peabody Museum, Cambridge.

From 1902 to 1909, we also find coöperating with the Department Dr. J. C. Merriam, Assistant, later Associate and now (1912—) full Professor of Palaeontology and Historical Geology at the University of California. During these years he delivered in the Department, during the second half of each season and as a course in Physical Anthropology, a series of lectures on the "Geological History of Man." Professor Merriam remains one of the most earnest students of the problems of man's antiquity on this continent. For years now he has carried on careful explorations in the California caves; he re-investigated the history of the Calaveras skull and the deposits of the Table Mountain; and we owe to him a careful examination into the La Brea find of human bones, which a few years ago created such unwarranted expectations. His published contributions to these subjects are as follows:

Recent cave exploration in California. *Am. Anthropol.*, 1906, VIII, 221-228.

Preliminary report on the discovery of human remains in an asphalt deposit at Rancho La Brea. *Science*, 1914, XL, 198-203.

At this year's spring meeting of the National Academy Professor Merriam delivered the two William Ellery Hale Lectures, on "The Beginnings of Human History from the Geological Record;" and since the organization in 1916 of the National Research Council, he has

taken a large part in the activities of this body and has shown himself invariably an earnest friend of Physical Anthropology.

Doctor Kroeber, since 1908 Curator of the Anthropological Museum of the University and since 1911 Associate Professor of Anthropology, while professionally an ethnologist, has always favored the development of Physical Anthropology and the promotion of research relating to man's antiquity in the California mounds, as well as in other directions. We owe to him an early recognition of the modern character of the La Brea skull, and two papers dealing directly with anthropometric observations. These are:

Measurements of Igorotes. *Am. Anthropol.*, 1906, VIII, 194-195.

Measurements of Chukchis. *Am. Anthropol.*, 1909, XI, 531-533.

In 1906, at the request of Doctor Kroeber, the skeletal collections from California preserved at that time in his Department were subjected to examination by the writer, the report upon them being published in Vol. IV, No. 2, of the University Publications.

In 1910-1912, a course of lectures in connection with the Department, on "Origin and Antiquity of Man," was given yearly by Mr. N. C. Nelson; and in 1915-1916 a similar course was in charge of Dr. W. D. Wallis. For many years there has also been given a comprehensive course in General Anthropology, dealing for one semester with man's evolution, antiquity, heredity, etc., through the medium of three lectures and one conference a week. This course is given by the department staff in coöperation.

THE SAN DIEGO MUSEUM

This Museum, which dates only from the beginning of 1917, is located in one of the permanent structures of the Panama-California Exposition (1915-1916), and its collections are a heritage from the Exposition. This heritage includes however the most comprehensive and in many respects the most valuable existing exhibits in Physical Anthropology.

These exhibits came to existence through an arrangement entered into in 1912 between the Exposition and the Smithsonian Institution, under plans and in charge of the writer. They consist almost wholly of original material, secured for the purpose on a series of expeditions, and extend to the subjects of (1), Human evolution and early man; (2) Human development (from the egg onward); (3) Human variation; and (4) Man's decline and elimination, together with racial pathology.

The exhibits and the expeditions undertaken in connection with their preparation, were briefly described in the *Proceedings of the National Academy of Sciences*, of 1915 and 1916 (I, 235-238; *ibid.*, 407-410; and II, 32-37).

A due credit for the possibilities of realization of these exhibits is due to Dr. Edgar L. Hewett, Director of the Exposition and now head of the Museum, and Mr. D. C. Collier, the first President of the Exposition.

MISCELLANEOUS

While the preceding notes touch briefly on all the more important centers of anthropological activity in this country, they fail to mention a number of incipient or detached collections in Physical Anthropology, such as those at the Valentine Museum, Richmond, the Carnegie Museum, Pittsburgh, the Davenport Academy of Sciences, and those of several of the Anatomical departments connected with our Universities, such as Ithaca, Stanford, etc.; they do not touch upon the subject of gymnasium anthropometry, practiced in many colleges, of prison anthropometry, or that of the various developing stations for child welfare; they do not include a number of detached students, who have within recent years begun to contribute to knowledge in our branch; and they of necessity have avoided the important collateral fields of heredity and eugenics.

As to the various American collections in Physical Anthropology, they will receive separate attention in the *Journal* in the future. College and prison anthropometry follow, regrettably, their own lines and use more or less separate instruments, in result of which most of the work is lost to Anthropology; and the many measurements that are being taken by nurses, teachers, physicians, etc., on children, while of practical utility, do not possess sufficient accuracy to be of strict scientific value.

Of individual investigators, a special mention should be made, in New York—of Prof. R. S. Woodward, for his work in racial psychology; Prof. E. L. Thorndike, for his *Mental and Social Measurements*, which are useful to anthropometry; and of Dr. Maurice Fishberg, for his contributions on the anthropology and eugenics of the Jews; at Cornell—of Prof. Burt G. Wilder, now retired, who brought together the remarkable brain collection of that University; at Princeton—of Prof. E. G. Conklin, who has given us recently an excellent work on *Heredity and Environment in the Development of Men* (2d ed., Princ.,

1918); in Washington, D. C.—of Alexander Graham Bell, who has given us a series of valuable papers and memoirs on heredity, longevity and related subjects; of Dr. J. B. Nichols, for his painstaking study on the numerical proportions of the sexes at birth; of Dr. Tom Williams, for his very interesting studies on delinquent and abnormal children; of Drs. Frank Baker and Geo. M. Kober, sincere and active friends of Physical Anthropology; of Mr. Paul Popenoe, the very active and efficient editor of *The Journal of Heredity*; of Mr. Wm. H. Babcock, the 1917–1918 President of the Anthropological Society of Washington, who has devoted years of work to the problems of pre-Columbian European contacts with this continent; of Mr. E. T. Williams, Chief of the Far-Eastern Division at the State Department and actual President of the Anthropological Society, a close student of the racial problems of eastern Asia; at the University of Wisconsin—of Prof. C. R. Bardeen, who has contributed much to our knowledge of the development of the skeleton and other parts; at the Stanford University—of Prof. A. W. Myer, who has given us a series of careful notes on osteological and other anomalies observed by him or his students during dissections. This list could be enlarged and prolonged to other cities; it should include workers in collateral lines, particularly in racial pathology and insurance statistics, such as Messrs. F. L. Hoffman and L. I. Dublin, and in various branches of biology, such as Gerrit S. Miller, and others. It represents collectively a very considerable asset to Physical Anthropology. How important is the total of these side contributions can best be seen from the following lists, which represent publications relating to physical anthropology⁴ by living authors which were not mentioned in this report in other connections, from the four most closely related periodicals, namely the *American Anthropologist*, the *Anatomical Record*, the *American Journal of Anatomy*, and the *Journal of Heredity*,⁵ since the beginning of their publication.

⁴ Some of these papers are not exclusively somatological, but contain extended observations of value to Physical Anthropology.

⁵ Before this the journal was known as *The American Breeders Magazine*, which also contains a number of articles relating more or less directly to physical anthropology.

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YEAR	VOL.	NO.
1899,	I,	1. BABCOCK (W. H.)—The Nanticoke Indians of Indian River, Del.; 277-282.
		3. MOONEY (J.)—The end of the Natchez; 510-521.
1900,	II,	3. COOK (ALICE C.)—The aborigines of the Canary Islands; 451-493.
1901,	III,	1. BOGORAS (W.)—The Chukchi of Northeastern Asia; 80-108. JOHNSTON (W. W.)—The ill health of Charles Darwin; 138-158.
1902,	IV,	HUXLEY (H. M.)—Preliminary report of an anthropological expedition to Syria, 47-51. 2. WRIGHT (R. R.)—Negro companions of the Spanish explorers; 217-228. 3. WARDLE (H. NEWELL)—Evanescant congenital pigmentation in the sacro-lumbar region; 412-420. CUTLER (J. E.)—Tropical acclimatization; 421-440. 4. FISHBERG (M.)—Physical anthropology of the Jews. I.—The Cephalic Index; 684-706.
1903,	V,	1. FISHBERG (M.)—Physical anthropology of the Jews; II.—Pigmentation; 89-106. 3. VERNER (S. P.)—The yellow men of central Africa; 539-544. 4. WOOD (EDITH E.)—Notes on oriental [Chinese, Japanese] babies, 659-666.
1904,	VI,	2. SKINNER (G. A.)—"Casco foot" in the Filipino; 299-302. 5. MOORE (CLARENCE B.)—Aboriginal urn-burial in the United States; 660-669. CRAMPTON (C. W.)—Pubescence; 705-709.
1905,	VII,	1. NICHOLS (J. B.)—The sex composition of human families; 24-36. HENSHAW (H. W.)—Popular fallacies respecting the Indians; 104-113. 4. MERRIAM (C. HART)—The Indian population of California; 594-606.
1906,	VIII,	2. BREWSTER (E. T.)—Notes on the determination of sex in man; 236-242. STEFÁNSSON (V.)—The Icelandic colony in Greenland; 262-270. HITZ (J.)—Helen Keller; 308-324.
		4. MONTGOMERY (H.)—Remains of prehistoric man in the Dakotas; 640-651. (Mainly archeological.)
1907,	IX,	1. BRENNEMAN (J.)—The sacral or so-called "Mongolian" pigment spots of earliest infancy and childhood, with especial reference to their occurrence in the American negro; 2-30.

- 1907, IX, 2. KENNARD (A. S.)—The racial derivation of the Ossetes; 276-286.
3. WRIGHT (G. F.)—Recent geologic changes as affecting theories of man's development; 529-532.
- 1908, X, 1. MONTGOMERY (H.)—Prehistoric man in Manitoba and Saskatchewan; 33-40. (Mainly archeological.)
- HERZOG (M.)—The brain weight of the Filipino; 41-47.
2. NORTH (A. W.)—The native tribes of Lower California; 236-250.
4. MONTGOMERY (CH. J.)—Survivors from the cargo [of slaves] of the negro slave yacht "Wanderer;" 611-623.
- 1910, XII, 3. BARROWS (D. P.)—The Negrito and allied types in the Philippines; 358-376.
- 1912, XIV, 1. FEWKES (J. W.) etc.—Symposium on "The problem of the unity or plurality and the probable place of origin of the American aborigines;" 1-59.
- FISHBERG (M.)—Remarks on Radosavljevich's critical contribution to "School Anthropology;" 131-141.
- 1913, XV, 4. SCOTTSBERG (C.)—Observations on the natives of the Patagonian Channel region; 578-616.
- PEARL (R.) AND R. N. SALAMAN—The relative time of fertilization in the ovum and the sex ratio amongst Jews; 668-674.
- 1914, XVI, 1. EMMONS (G. T.)—Portraiture among the north Pacific coast tribes; 59-67.
- 1915, XVII, 2. HATT (G.)—Artificial moulding of the infant's head among the Scandinavian Lapps; 245-256.
3. POYNTER (C. W. M.)—A study of Nebraska crania; 509-524.
- 1916, XVIII, 2. SPECK (F. G.)—Remnants of the Machapunga Indians of North Carolina; 271-276.
3. GREGORY (W. K.)—Note on the molar teeth of the Piltdown mandible; 384-387.
- 1917, XIX, 4. POYNTER (C. W.)—Some conclusions based on studies in cerebral anthropology; 495-502.

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- 1908, II, 3. BOOKWALTER (C. F.)—Report on a curious variation in the insertion of the *Rhomboideus* major in a negro; 96-98.
4. CORSON (E. R.)—Fusion of the semilunar and cuneiform bones in both wrists of an adult male negro; 143-145.
9. EVANS (H. M.)—On an instance of two subclavian arteries to the early arm bud in man; 411-424.
- 1910, IV, 3. MURPHY (J. B.)—Note on the sulcus lunatus in negro and white brains and its relation to the area striata; 115-122.
4. JOHNSTON (J. B.)—The evolution of the cerebral cortex; 143-166.

- 1911, v, 4. ORTON (S. T.)—Note on an anomaly of the postcentral sulcus simulating the double rolandic of Giacomini; 179-182.
8. HATAI (SHINKISHI)—An interpretation of growth curves from a dynamical standpoint; 373-382.
10. MELLUS (E. L.)—A contribution to the study of the cerebral cortex in man; 473-482.
12. SMITH (G. M.)—A statistical review of the variations in the anatomic positions of the caecum and the processus vermiformis in the infant; 549-556.
- 1912, vi, 12. GIVENS (M. H.)—Duplication of the inferior vena cava in man; 475-486.
- 1913, vii, 1. SCHAEFFER (J. P.)—On two muscle anomalies of the lower extremity; 1-8.
6. INGALLS (N. W.)—Musculi sternales and infra-clavicularis; 203-206.
10. LORD (F. P.)—Observations on the temporo-mandibular articulation; 355-368.
- 1914, viii, 1. SCHAEFFER (J. P.) AND L. H. NACHAMOFSKY—Some observations on the anatomy of the upper extremities of an infant with complete bilateral absence of the radius; 1-14.
- COBEY (J. F.)—An anomalous right subclavian artery; 15-19.
- PERKINS, Jr. (J. D.)—An anomalous muscle of the leg: Peroneo-calcaneus internus; 21-25.
4. JOHNSTON (J. B.)—The nervus terminalis in man and mammals; 185-198.
5. SANTEE (H. E.)—The brain of a black monkey (*Macacus maurus*): The relative prominence of different gyri; 257-266.
6. DUPRE (B. G.) AND T. W. TODD.—A transitional type of cervical rib, with a commentary; 313-324.
- LEONHART (G. P.)—A case of stylo-hyoid ossification; 325-332.
- HARVEY (R. W.)—A case of multiple renal arteries; 333-339.
- DRIVER (J. R.) AND A. B. DENISON—The morphology of the long accessorius muscle; 341-347.
8. MILLER (J. C.)—Ossiculum lus; 415-419.
- 1915, ix, 2. DECKER (H. R.)—Report of the anomalies in a subject with a supernumerary lumbar vertebra; 181-189.
- DOCKERAY (F. C.)—Volumetric determinations of the parts of the brain in a human fetus 156 mm. long (crown-rump); 207-211.
6. LORD (F. P.)—Some anatomical deductions from a pathological temporo-mandibular articulation; 459-464.
7. MEYER (A. W.)—Spolia anatomica, addenda I; 483-527.
10. BEVIER (GEORGE)—An anomalous origin of the subclavian artery; 785-789.

- 1915, x, 1. INGALLS (N. W.)—Truncus arteriosus communis persistens; 9-14.
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- 1916, x, 5. McCOTTER (R. E.)—Three cases of the persistence of the left superior vena cava; 371-383.
9. McCOTTER (R. E.)—Regarding the length and extent of the human medulla spinalis; 559-564.
- 1916, xi, 3. GILLASPIE (C.), LEWIS I. MILLER AND MORRIS BASKIN—Anomalies in lobation of lungs with review of literature; 65-75.
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- 1917, xii, 1. MEYER (A. W.)—Spolia anatomica, addenda II; 43-94.
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2. WALLIS (W. D.)—The development of the human chin; 315-328.
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- 1917, xiii, 2. REYNOLDS (L. R.)—Hyperphalangism accompanied by epiphyses and muscular deficiencies; 113-126.
3. LILLIE (R. D.)—Variations of the canalis hypoglossi; 131-144.
5. HOWELL (J. A.)—An experimental study of the effect of stress and strain on bone development; 233-252.
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BALTIMORE, MD., 1901-

- 1901, i, 1. BARDEEN (C. R.) AND W. H. LEWIS—Development of the limbs, body-wall and back in man; 1-37.
- 1902, i, 2. LEWIS (W. H.)—The development of the arm in man; 145-183.
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4. SUDLER (M. T.)—The development of the nose, and of the pharynx and its derivatives in man; 391-416.
- 1903, ii, 2. SCHLAPP (M. G.)—The microscopic structure of cortical areas in man and some mammals; 259-281.
- 1904, iv, 1. McMURRICH (J. P.)—The phylogeny of the crural flexors; 33-76.
- 1905, iv, 2. BARDEEN (C. R.)—The development of the thoracic vertebrae in man; 163-174.

- 1905, IV, 3. BARDEEN (C. R.)—Studies of the development of the human skeleton; 265-303.
4. GAGE (SUSANNA P.)—A three weeks' human embryo, with especial reference to the brain and the nephric system; 409-444.
- 1906, V, 4. BREMER (J. L.)—Description of a 4-mm. human embryo; 459-480.
- 1906, VI, 1. FLINT (J. M.)—The development of the lungs; 1-137.
- 1907, VI, 3. BARDEEN (C. R.)—Development and variation of the nerves and the musculature of the inferior extremity and of the neighboring regions of the trunk in man; 259-390.
4. McMURRICH (J. P.)—The phylogeny of the plantar musculature; 407-437.
- 1907, VII, 1. ESSICK (C. R.)—The corpus ponto-bulbare—A hitherto undescribed nuclear mass in the human hind brain; 119-137.
2. MELLUS (E. L.)—Relations of the frontal lobe in the monkey; 227-244.
- STREETER (G. L.)—The cortex of the brain in the human embryo during the fourth month with special reference to the so-called "Papillae of Retzius;" 337-344.
- 1908, VIII, 1. TAUSSIG (F. J.)—The development of the hymen; 89-108.
2. BARDEEN (C. R.)—Early development of the cervical vertebrae and the base of the occipital bone in man; 181-186.
- 1909, IX, 1. JACKSON (C. M.)—On the prenatal growth of the human body and the relative growth of the various organs and parts; 119-161.
- 1910, X, 2. SCHAEFFER (J. P.)—The sinus maxillaris and its relations in the embryo, child and adult man; 313-368.
- 1911, XI, 3. GUDERNATSCH (J. F.)—Hermaphroditismus verus in man; 267-278.
- 1911, XII, 1. LISSER (H.)—Studies on the development of the human larynx; 27-66.
- WHITEHEAD (R. H.) AND J. A. WADDELL—The early development of the mammalian sternum; 89-106.
- 1912, XIII, 1. SCHAEFFER (J. P.)—The genesis and development of the nasolacrimal passages in man; 1-24.
- ESSICK (C. R.)—The development of the nuclei pontis and the nucleus arcuatus in man; 25-54.
- 1912, XIV, 1. BULLARD (P. B.)—A comparative study of the three principal regions of the spinal cord in a series of mammals; 73-105.
- MELLUS (E. L.)—The development of the cerebral cortex; 107-117.
- 1913, XIV, 4. WIEMAN (H. L.)—Chromosomes in man; 461-471.
- 1913, XV, 3. WALLIN (I. E.)—A human embryo of thirteen somites; 319-331.
- 1914, XVII, 1. THYNG (F. W.)—The anatomy of a 17.8 mm. human embryo; 31-112.
- 1915, XVII, 2. DAVIS (H. K.)—A statistical study of the thoracic duct in man; 211-244.

- 1914, XVI, 3. MACKLIN (C. C.)—The skull of a human fetus of 40 mm.; 317-385; 387-426.
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- 1915, XVIII, 3. KINGSBURY (B. F.)—The development of the human pharynx.
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- 1916, XX, 1. SCHAEFFER (J. P.)—The genesis, development, and adult anatomy of the naso-frontal region in man; 125-146.
- 1917, XXI, 2. KOCH (J. C.)—The laws of bone architecture; 177-298.
- 1917, XXII, 1. STREETER (G. L.)—The factors involved in the excavation of the cavities in the cartilaginous capsule of the ear in the human embryo; 1-25.
3. WATT (J. C.)—Anatomy of a seven months' foetus exhibiting bilateral absence of the ulna accompanied by monodactyly (and also diaphragmatic hernia); 385-437.

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- 1914, V, 1. BELL (A. G.)—How to improve the race; 1-7.
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3. JOHNSON (R. H.)—Marriage selection; 102-110.
4. WILLCOX (W. F.)—Differential fecundity [in U. S. population]; 141-148.
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5. CHASE (J. H.)—Weakness of eldest sons; 209-211.
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6. KELLOGG (V. L.)—Faces and races; 249.
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7. *Editorial*—Second report of the Committee on Immigration of the Eugenics Section of the American Genetic Association; 297-300.
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8. HANKINS (F. H.)—The declining birth rate; 361-367.
9. SMITH (G. E.)—Man's pedigree; 377-388.
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10. HOFFMANN, G. v.—Eugenics in Germany; 435-436.
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11. BLAKESLEE (A. F.)—Corn and men; 511-518.
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- 1915, VI, 1. *Editorial*—Feeble-mindedness; 32-36.
2. BAILEY (L. H.)—War and biology; 51-54.
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3. *Editorial*—Eugenic legislation; 142-144.
4. SPRAGUE (R. J.)—Education and race suicide; 158-162.
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5. RUCKER (W. C.)—More "Eugenic Laws;" 219-226.
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 6. JOHNSON (R. H.) AND B. STUTZMANN—Wellesley's birth-rate; 250-253.
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 8. ROSANOFF (A. J.) AND H. E. MARTIN—Offspring of the insane; 355-356.
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 10. BILLINGS (W. C.)—Oriental immigration; 462-467.
 11. *Editorial*—Natural selection in man; 497-498.
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 12. CONKLIN (E. G.)—Value of negative eugenics; 538-541.
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- 1916, VII,
1. HOFFMANN (G. VON)—Race hygiene in Germany; 32.
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 2. *Editorial*—Brigham Young; 51-54.
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 3. *Editorial*—Long life means many children; 99-101.
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 4. STUCKEY (H. P.)—The slit-eyed people; 147.
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CANADA

The recent history of Physical Anthropology in Canada relates to the northwestern explorations, under the auspices of the British Association for Advancement of Science and of the American Museum of Natural History; to explorations of various ossuaries in the eastern lake region; and to the work carried on within recent years in connection with the Geological Survey of Canada.

In 1884, at its meeting in Montreal, the British Association for Advancement of Science voted that,

Dr. E. B. Tylor, Dr. G. M. Dawson, General Sir J. H. Lefroy, Dr. Daniel Wilson, Mr. Horatio Hale, Mr. R. G. Haliburton, and Mr. George W. Bloxam be a Committee for the purpose of investigating and publishing reports on the physical characters, languages, industrial and social condition of the North-western tribes of the Dominion of Canada; that Mr. Bloxam be the Secretary, and that the sum of 50 L. s. be placed at their disposal for the purpose.

The activities of this important Committee extended until 1898, and twelve annual reports on the results of its work were presented to

the Association. These contain the following contributions of interest to Physical Anthropology:

3rd Report—Suggestions for investigation of physical characters, senses and mental characters. Rep. B. A. A. S., 1888, 174-175.

4th Report—A letter of Dr. F. Boas, on his first investigations. Ibid., 1889, 233-236.

Wilson (Rev. E. F.)—Report on the Sarcee Indians. Ibid., 242-255.

5th Report (published separately)—First general report on the Indians of British Columbia. By Dr. Franz Boas.

6th-12th Report—Articles by Dr. Boas (see his bibliography); Physical characteristics of the tribes of British Columbia, 12th Rep., 1899, 628-644.

Report on the Kootenay Indians of south-eastern British Columbia (includes some measurements of the Shushwap), by A. F. Chamberlain, 8th Rep., 1893, 5-71; and the Summary of the work of the Committee, by Dr. Boas, with Index to Reports, and detailed tables of measurements. (4-12), 12th Rep., 667-688.

The somatological observations secured under the auspices of this Committee extended to eighteen of the westernmost tribes of Canada, in addition to which some skeletal material was secured from this region. And the investigations and collections thus favorably initiated have continued since under the auspices of the American Museum of Natural History, by the Jesup Expedition and by Mr. Harlan I. Smith, with the result that from the physical as well as other stand-points the northwestern tribes are now among the best known and best represented in our collections.

The work of Mr. Harlan I. Smith, since 1911 Archeologist of the Geological Survey of Canada, deserves a special mention in this connection. Though primarily interested in a separate branch of Anthropology, he has always taken great interest and scrupulous care in collecting skeletal material, and we owe him a grateful appreciation for valuable collections of this nature from Kentucky, from Lytton, B. C., from the Thompson and Frazer river regions, and from other localities.

As to explorations in ossuaries, mounds and village sites, special mention in Canada is due to *Mr. A. F. Hunter*, who has made extensive explorations in the Huron village sites of Ontario, which resulted in additions to our collections of skeletal material from that important region; and to *Prof. H. Montgomery*, of Toronto, who for many years has explored in ossuaries, burial pits and burial mounds in Canada and North Dakota. Professor Montgomery has published a number of papers on his explorations which are indirectly of interest to Physical Anthropology. In one of these, on the Otonabee, Ont., mounds, he

figures some skulls from the 'Serpent' mound and compares them with a Huron cranium (*Trans. Can. Inst.*, 1910, ix, Pt. I). A valuable collection of skulls which he secured from the mounds in North Dakota form part of the collection of the United States National Museum.

Dr. R. B. Orr and Mr. A. Blue of Toronto, Mr. C. Hill-Tout of British Columbia, Mr. J. C. Tache and Mr. W. D. Lightfall, have all explored burial sites and collected skeletal material, which is deposited in various Canadian museums and will be dealt with more especially on another occasion.

Still another living worker in Canada who has excavated considerably in ossuaries and whose explorations have resulted in important additions of skeletal material to our collections, is *Col. George E. Laidlaw*, of Ontario.

THE GEOLOGICAL SURVEY, OTTAWA, CANADA⁶

The Division of Anthropology in connection with the Geological Survey of Canada was established in 1910, and the section of Physical Anthropology was added in 1914, being placed in charge of Dr. (Sir) Francis H. S. Knowles. Doctor Knowles' work began in fact in the summer of 1912, when he spent six months in field work among the Iroquois. There is no public or laboratory instruction in connection with the Division, and it is regrettable to say that no such instruction has been given thus far anywhere in Canada. Doctor Knowles himself has been mainly interested in the Iroquois people, but unfortunately his work was interfered with for a time by poor health. He has published a paper on "The Glenoid Fossa in the Skull of the Eskimo" (*Geol. Surv.*, 1915, Bull. No. 9, 1-25); and also a "Report on a Skeleton from near Savona, B. C." (*Summary Rep. Geol. Surv.* for 1918).

Mr. J. A. Teit, engaged for the Division upon field work in the Interior of British Columbia, has taken a large number of photographs of Indian types, made a series of measurements, and collected valuable notes on the Physical Anthropology of the Indians of the Thompson River and other tribes of that region. *Mr. D. Jenness*, ethnologist attached to the Canadian Arctic Expedition, 1913-1916, has collected much Eskimo skeletal material and has prepared a valuable collection of measurements, notes and MSS. on the Physical Anthropology of the Eskimo, that awaits his return from the war for publication.

⁶ For much assistance in connection with his report on Canada and especially the Geological Survey the writer is indebted to Dr. Francis H. S. Knowles of the Survey.

REMARKS ON MEXICO

As already mentioned under Part *B*, the history of Physical Anthropology in Mexico is being written by Prof. Nicolas León, of the National Museum, Mexico, in consequence of which a brief note on the subject in this place must suffice.

Up⁶ to recently somatology in Mexico was represented practically by Doctor León alone, and he did creditable work under many difficulties. In 1910, following the Mexican session of the XVII International Congress of Americanists, there was organized in Mexico City the "International School of American Archeology and Ethnology," and in connection with this School, in 1916, Professor Boas was called to give a course of instruction in Anthropometry; but this, due largely to a lack of properly prepared students, was not successful. During the latter years of the revolution, the skeletal collections of the Museo Nacional were in a large measure disintegrated. What has been saved has recently, with some additions, been rearranged by Doctor León. In June of 1917, there was formed a "Section of Physical Anthropology" in the "Dirección de Estudios Arqueológicos y Etnográficos," under the Secretaría de Fomento, in city of Mexico, and the "Dirección" (Bureau) together with the Section were placed in charge of Sr. Manuel Gamio. A course of instruction in Physical Anthropology was organized under Dr. M. L. de la Vega and has made modest beginnings. The development of the Section, however, has been greatly hindered by a lack of instruments and collections, as well as in other directions. Its present status is uncertain.

Considerable somatological work has been done in Mexico within the last few decades by investigators from other countries. These included the French Scientific Mission to Mexico and Central America, the somatological results of which were published by Professor Hamy (4°, Paris, 1891); Professor Starr (*q. v.*), who has measured and taken casts of a series of Indian tribes in Central and Southern Mexico; and the writer, who examined the tribes from Sonora and Chihuahua to the State of Morelos.

It is to be hoped that a strong center in Physical Anthropology will soon develop in Mexico, which possesses such anthropological riches, and is confronted in its living population by so many anthropological problems which must have a direct bearing on the existence and progress of the Republic.

SUMMARY

Leaving details out of consideration, it is readily seen that the recent history and present status of Physical Anthropology in the United States (and Canada as well as Mexico) are the history and status of an important branch of science in its formative stages, advanced more or less in different localities according to the presence or absence of circumstances favorable to development. We see a gradual change from individualistic and accidental efforts to sustained, well-planned, organized work, and from speculative procedure to one severely analytic and critical, strictly scientific in the best modern sense of the word. In addition, in the course of this change the branch has become strongly buttressed by great reference collections which constitute a firm foundation for future building.

The initial, narrower problems which first engrossed the branch in this country, as elsewhere, are passing, and the way opens to the greater, national, continental and world fields of research, with their broad horizons. And we are confronted no more with the attraction merely of the unknown, but also with a strong call of duty for the application of the gained knowledge. The volume and importance of the accumulating knowledge in this line will soon be such, that no high-class center of learning will be able to afford not to profit by it, and we can confidently look to early and considerable extension of anthropological instruction. And with substantial advance in knowledge and instruction in this branch, will come also the needed support for publication, for wider field work, for extensions in study, and proper provision for the workers.

- Here is a branch of science well worth the best efforts of those who devote themselves to it; and they are fortunate in that they can still assist so much in its perfection and application.

NOTES ON THE ANTHROPOLOGY OF SWEDEN

FRANZ BOAS

In their monumental work *Anthropologia Suecica* (fol., Stockholm, 1902) Gustaf Retzius and Carl M. Fürst have given us an excellent collection of data relating to the anthropometric characteristics of the Swedes. The material consists of a study of the enlisted men of the years 1897 and 1898.

In connection with a study of the variability of European types, and on the basis of the data presented in the work just referred to, I have calculated a number of values which are here given.

A few explanatory remarks of the table are necessary. I have given the cephalic index as actually observed on the head of the living,—not reduced to the cranium by deduction of two units, as has been done in the *Anthropologia*. There are minor differences in the results of my calculations and those of the authors, the only important ones being the results for Bohuslän (77.84 instead of 77.13), Östergötland (77.74 instead of 77.15), Hälsingland (77.88 instead of 76.88), and Medelpad (77.86 instead of 77.21). The values for length of head and width of head, given on pp. 111 and 116 of the *Anthropologia*, are all 2.5 mm. too low, because they were reckoned from the lower limit of each interval of 5 mm. The values contained in the present table were calculated from the table of 5 mm. intervals, with the necessary correction for variability required for the large size of the interval, according to the formula.

$$\sigma^2 = \sigma_1^2 - \frac{d^2}{12},$$

where σ is the true variability, σ_1 , the variability calculated from the series with the interval d . The statures were calculated from the 5 cm. table on p. 49, and the same corrections were applied in this case as in the preceding. Since the individuals of a stature of less than 157 cm. as well as of others unfit for military service were excluded, all the statures are a little too high, and all the variabilities too low—the more so the shorter the average stature. According to the data

given by Hultkrantz,¹ the number of those under 157 cm. is for the shortest average stature nearly 4 per cent. This would change the values for Västerbotten (170.3 ± 5.86) to about 169.9 ± 6.08 .

The averages and variabilities for hair were obtained on the assumption that the distribution of pigmentation (excepting red hair) follows the exponential law. Then, to a certain frequency corresponds a definite multiple of the standard variation σ . These values were taken from Shepherd's tables.² If a designates the average; o_1 and o_2 those multiples of σ for which the observed frequencies of "blond" and "cendré" are equal to the observed percentile frequencies (excluding red), we have

$$\begin{aligned} a + o_1 \sigma &= b \\ a + o_2 \sigma &= c. \end{aligned}$$

where b and c represent the unknown quantitative values which correspond to the terms "blond" and "cendré." Then

$$\begin{aligned} \sigma &= \frac{c - b}{o_2 - o_1} \\ a &= c - \frac{o_2}{o_2 - o_1} (c - b) \end{aligned}$$

In our table the values of $\frac{1}{o_2 - o_1}$ and $\frac{o_2}{o_2 - o_1}$ are given.

These express the relative values of the averages and variabilities. The largest negative values of the first column indicate the lowest degree of pigmentation.

While the results of this calculation for color of hair give quite satisfactory results, eye-color cannot be treated in the same way, because the distributions of blues and browns are probably independent of each other. We might assume all the grey, mixed and brown color to contain brown pigment, the amount of which is distributed according to the exponential law. Then all the blues might be considered as without brown pigment. This leaves out of consideration all variations except those of brown, but no other information can be gained from the published material. In this manner the variabilities and

¹ J. Vilh. Hultkrantz, Om svenskarnas kroppslängd, ett bidrag till Sveriges antropologi, Ymer 1896.

² *Biometrika*, Vol. II, pp. 174 et seq.

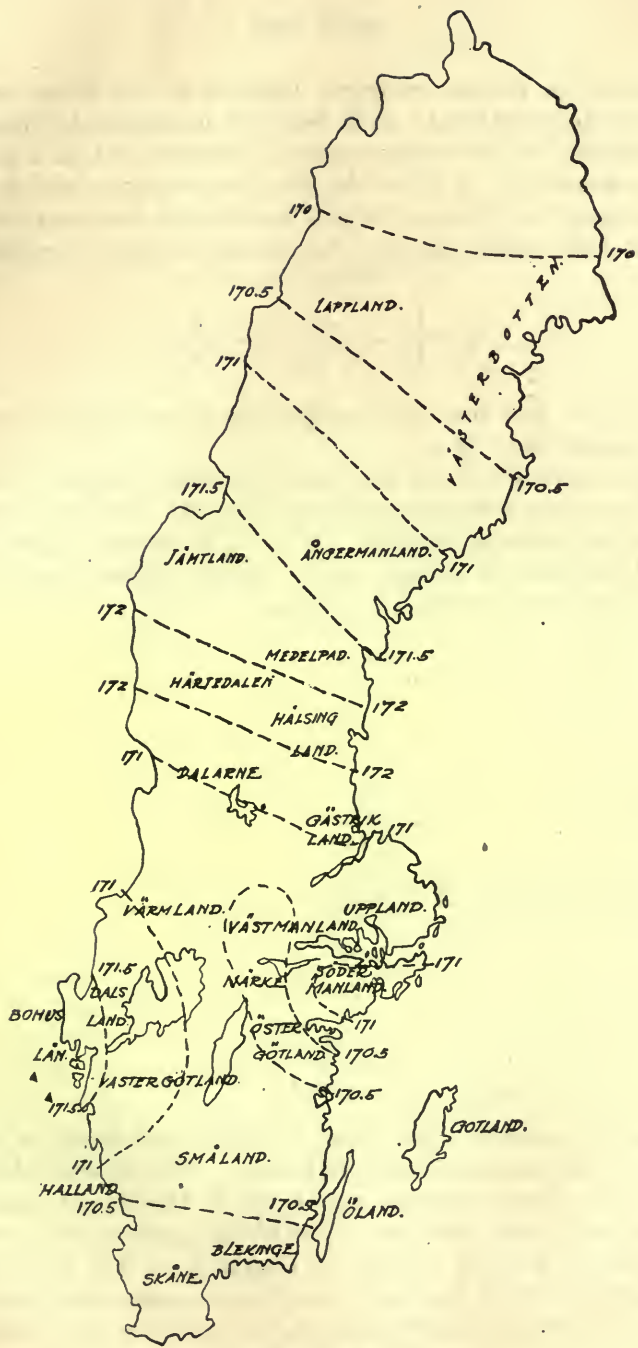


FIG. 1. AVERAGE STATURE

averages of the amount of brown pigment in the series containing brown may be ascertained. It is, however, impossible to obtain comparative values for the average amount of brown without a numerical value corresponding to either the limit between grey and mixed, or between mixed and brown. If p is the relative frequency of all individuals with brown pigment, the average amount of pigmentation will be

$$a = \left\{ c - \frac{o_2}{o_2 - o_1} (c - b) \right\} p,$$

and this term does not yield comparable values unless a numerical value is known for b or c .

The last column contains the values for the co-efficient of correlation between length of head and width of head. This has been determined in the following manner. If σ_i , σ_e , σ_b are the values for the standard variations of cephalic index i , length of head l , and width of head b ; x , y and z individual deviations,

$$\begin{aligned}\sigma_i + x &= \frac{b + z}{l + y} \\ x &= \frac{b}{l} \left(\frac{z}{b} - \frac{y}{l} \right) \\ \sigma_i^2 &= \frac{b^2}{l^2} \left(\frac{\sigma_b^2}{b^2} + \frac{\sigma_l^2}{l^2} - 2r \frac{\sigma_b \sigma_l}{bl} \right)\end{aligned}$$

We call the co-efficient of variation of i , l and b

$$\begin{aligned}\frac{\sigma_i}{i} &= v_l & \frac{\sigma_b}{b} &= v_b & \frac{\sigma_l}{l} &= v_b \\ r &= \frac{v_b^2 + v_l^2 - v_i^2}{2 v_b v_l}\end{aligned}$$

Retzius has already pointed out the great uniformity in the distribution of the head index all over Sweden. The present table shows also, that in this respect the population is throughout remarkably homogeneous in each province. The lowest value of the variability of the cephalic index is ± 2.70 for Gottland, ± 2.74 for Bohuslän, the highest ± 3.28 for Uppland, ± 3.27 for Ångermanland and Östergötland. Retzius has shown that in the provinces with high index

FIG. 2

Breadth of head- - - - -
Length of head.....

Valloon and Finnish immigration may be in part the cause of the increased number of shorter heads, which would account for the increased variability.

In Denmark³ average and variability for men are 80.7 ± 3.29 , for women 81.5 ± 3.26 . For Bornholm⁴ the corresponding values are for men 80.3 ± 2.92 , for women 80.7 ± 3.20 . The former values may, however, be high, because the population is massed regardless of localities.

In Italy there are great variations in the value of the head index. The variability calculated for small districts ranges between ± 3.17 and ± 4.68 .⁵

The values obtained in France and Germany are almost throughout large.

It is noteworthy that the cephalic index for Stockholm has a low variability, ± 2.84 , while we might expect a high value on account of the greater influx of foreign elements in the capital. This agrees with the observations previously made by me in regard to the unexpectedly low variability of the index in large cities—perhaps on account of a slight unifying environmental effect.

The most striking features of the distribution of types have been described by Retzius and Fürst. Our maps bring out with great clearness the gradual decrease of stature and length of head, the increase of width of head, and of pigmentation, in the north. They also show an increase of variability of the head index in the most northern parts of the country. The two maps showing the distribution of pigmentation indicate the occurrence in the population of Sweden of a strongly pigmented type on the northern coast and a very sudden change of type in the region of Dalecarlia. The strongest pigmentation is in Hälsingland, and north eastern part of Dalecarlia. The variability of pigmentation for Dalecarlia is exceptionally high. This is evidently due to the great local differences in a limited territory, and would disappear if we had the records for small administrative units of this province. It is also worthy of note that the highest statures of more than 172 cm. are found in the area in which these rapid changes of pigmentation occur.

³ Carl Burrau in *Meddelelser om Danmarks Antropologi*, I, 1907-1911, pp. 244, 245.

⁴ Calculated from the table given by L. Ribbing, *ibid.*, p. 195.

⁵ Franz Boas and Helene Boas, *The Head-Forms of Italians etc.*, *Am. Anthropol.*, 1913, xv, 163.



FIG. 3. CEPHALIC INDEX

Average

Variability-----

The upper Dalecarlians take an exceptional position in many ways. We have in their area, besides slight pigmentation and high stature, a very low variability of cephalic index, a low correlation for length and width of head, and absolutely long heads,—characteristics which we are accustomed to ascribe to the purely northern type. Similar conditions prevail in Bohuslän and Dalsland, where, however, we find a very high value for the correlation for the length and width of head. Another area of pronounced individualization is Uppland. Approaching this province from the west we find increasing pigmentation, increasing cephalic index, with increasing variability, decreasing correlation of length and width of head, increasing absolute width and decreasing absolute length of head. The same changes occur on the whole as we approach this district from the north and south. The location of these centers brings it about that a line roughly drawn through southern Dalecarlia, Västmanland, and Södermanland represents in many respects a turning-point of features of the Swedish population. Along this line we find a minimum of stature a maximum of pigmentation of hair, a minimum of cephalic index, maximum variability of cephalic index, low correlation of length and width of head, maximum length of head and minimum width of head. The line for greatest frequency for blue eyes lies farther south, running from Dalsland to Småland.

The lines given on our maps are, of course, only rough approximations. This is due to the fact that the political divisions, from which the data have been published, are very large, and local variations are for this reason obscured. Furthermore the data for Härjedalen, one of the most interesting provinces are very scant, being based on 95 individuals only. The principal desideratum for a better knowledge of the anthropology of Sweden is the publication of data from small political units, particularly in those districts in which there is a rapid change in regard to any particular feature. Considering the uncertainty of the lines, the agreement between the various features may be considered as fairly good, in so far as in most cases any irregularity of distribution in one respect is accompanied by irregularities in other respects. These correlations are least clearly indicated in the cases of stature and width of head. I think it may be possible that a detailed study of distributions based on exhaustive material obtained from small local groups may show us in how far there exist close correlations between the various features. This would help us clear up the racial significance of various anthropometric traits.

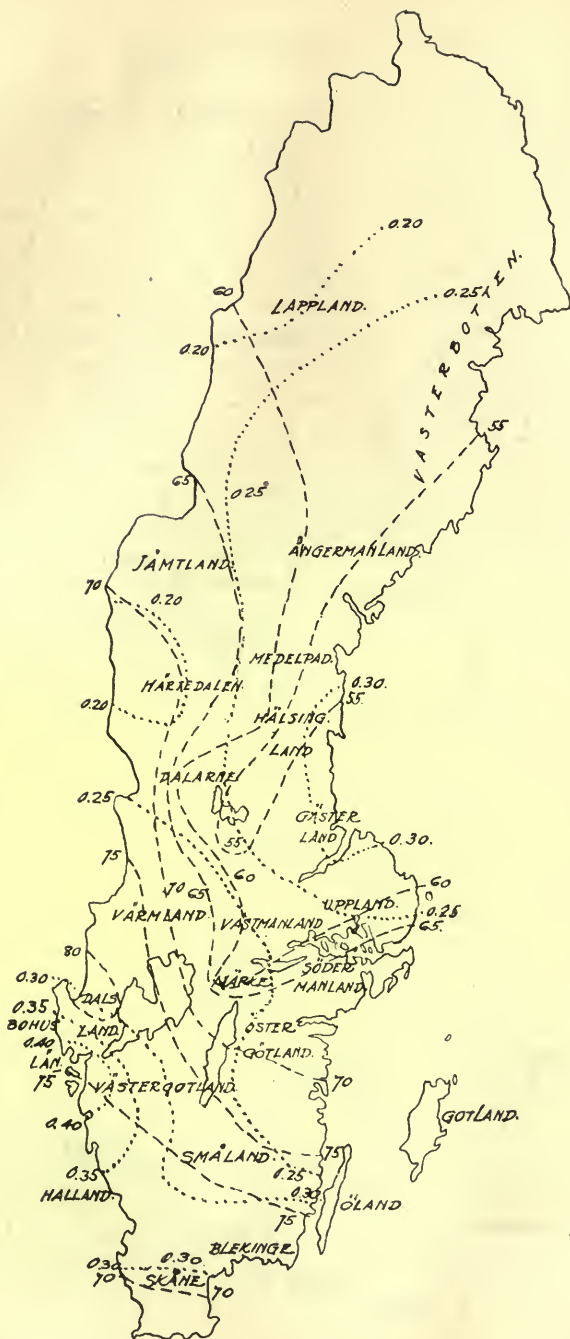


FIG. 4.

Frequency of blue eyes in supposed homozygous population-----
 Correlation between length and breadth of head.....



FIG. 5. COLOR OF HAIR

The distribution of the index of correlation of length and width of head brings up a number of interesting problems. While the variability of the head index in Sweden increases with the value of the cephalic index, except in the extreme south where all the nordic features are attenuated, the co-efficient of correlation behaves in the most irregular manner. In Bohuslän where we have a low cephalic index and low variability, we have a very high correlation. In Dalecarlia and Härjedalen low values of cephalic index and of variability are associated with very low correlations. In how far this may be related to the occurrence of the rapid change in pigmentation or to other causes cannot be ascertained with certainty. It is also interesting that the index of correlation is very high in the two islands Öland and Gotland, in which we have presumably a population of mixed origin with long continued inbreeding; but it is also high in Stockholm where we have probably the most heterogeneous population of the whole state.

I have not plotted the variability of length and width of head which have also some peculiar features, that, however, do not seem to me sufficiently well established. The most striking point is the lack of agreement between these values among themselves and with the variability of the cephalic index.† The variability for length of head has a minimum, that of width of head a maximum in or near Bohuslän. Both are rather high in Uppland, but the greatest variability of head length is in the same northern coast strip in which the lowest number of blue eyes occurs, while the variability of width of head is lowest about Dalecarlia. These values and those for the coefficient of correlation are, of course, independent.

From what we know about the distribution of variabilities and of the index of correlation, it is clear that the only way in which the causes for these peculiarities can be explained is to make extended observations on family groups, which would make it possible to determine the degree and the influence of inbreeding upon the physical characteristics of the population

So far as anthropological method is concerned, the results of the Swedish enterprise show that for similar investigations, the publication of data from small political units and observations on family groups are indispensable.

AVERAGES AND STANDARD VARIATIONS

	CEPHALIC INDEX	LENGTH OF HEAD	WIDTH OF HEAD	COLOR OF HAIR	STATURE	r_{12} INDEX OF CORRELATION
Skåne.....	79.01 \pm 2.86	194.9 \pm 5.90	154.9 \pm 5.10	-0.67 \pm 0.75	170.2 \pm 5.68	0.35
Halland.....	78.40 \pm 2.97	195.3 \pm 6.00	154.0 \pm 5.30	-0.55 \pm 0.56	170.5 \pm 5.63	0.33
Småland.....	78.52 \pm 3.08	194.5 \pm 6.05	153.6 \pm 5.10	-0.57 \pm 0.57	170.8 \pm 5.63	0.26
Blekinge.....	78.57 \pm 3.00	193.5 \pm 6.25	153.0 \pm 5.10	-0.62 \pm 0.72	170.1 \pm 5.55	0.33
Öland.....	78.13 \pm 2.76	196.4 \pm 6.55	154.4 \pm 5.40	-0.54 \pm 0.54	171.3 \pm 6.00	0.47
Gottland.....	78.75 \pm 2.70	195.5 \pm 5.90	154.8 \pm 5.15	-0.03 \pm 0.57	172.8 \pm 6.03	0.42
Bohuslän.....	77.84 \pm 2.74	195.9 \pm 6.15	153.5 \pm 5.75	-0.56 \pm 0.53	172.2 \pm 5.81	0.49
Dalsland.....	76.84 \pm 2.85	196.9 \pm 5.85	152.2 \pm 5.05	-0.65 \pm 0.78	171.5 \pm 6.05	0.28
Västergötland..	78.02 \pm 3.00	195.1 \pm 6.05	153.0 \pm 5.10	-0.64 \pm 0.59	171.4 \pm 5.83	0.29
Östergötland...	77.74 \pm 3.27	195.5 \pm 6.35	152.9 \pm 5.10	-0.46 \pm 0.59	170.5 \pm 5.74	0.19
Värmland.....	77.49 \pm 3.00	196.2 \pm 6.00	152.9 \pm 5.10	-0.51 \pm 0.73	171.0 \pm 5.73	0.28
Närke.....	77.27 \pm 3.03	196.4 \pm 6.05	152.6 \pm 5.20	-0.35 \pm 0.62	170.5 \pm 5.57	0.28
Södermanland..	76.81 \pm 2.83	196.8 \pm 6.04	152.0 \pm 4.75	-0.38 \pm 0.53	171.3 \pm 5.73	0.29
Västmanland...	77.34 \pm 2.98	196.6 \pm 5.80	152.8 \pm 5.05	-0.70 \pm 0.78	170.4 \pm 5.63	0.25
Uppland.....	78.85 \pm 3.28	194.4 \pm 6.05	154.5 \pm 5.45	-0.47 \pm 0.67	170.7 \pm 5.53	0.23
Stockholm.....	78.01 \pm 2.84	193.8 \pm 6.50	152.9 \pm 4.95	-0.03 \pm 0.68	171.5 \pm 6.03	0.40
Dalarne.....	77.01 \pm 2.97	197.2 \pm 6.00	152.7 \pm 4.92	-0.95 \pm 1.05	170.8 \pm 5.79	0.25
Gästrikland....	77.74 \pm 3.07	196.4 \pm 6.50	153.5 \pm 5.13	-0.08 \pm 0.73	171.1 \pm 5.37	0.31
Hälsingland....	77.88 \pm 2.99	196.3 \pm 6.57	153.7 \pm 4.88	+0.02 \pm 0.82	172.4 \pm 5.72	0.31
Medelpad.....	77.86 \pm 3.00	196.0 \pm 6.35	153.5 \pm 4.73	-0.17 \pm 0.75	171.5 \pm 5.27	0.26
Jämtland.....	77.74 \pm 3.08	196.2 \pm 6.25	153.4 \pm 5.09	-0.24 \pm 0.68	171.6 \pm 5.66	0.26
Härjedalen....	77.83 \pm 2.88	195.8 \pm 6.15	153.3 \pm 4.03	-0.25 \pm 0.72	172.6 \pm 6.00	0.19
Ångermanland..	78.68 \pm 3.27	194.5 \pm 6.50	153.9 \pm 5.35	-0.17 \pm 0.60	171.2 \pm 5.87	0.26
Lappland.....	79.46 \pm 3.21	195.6 \pm 6.05	156.2 \pm 5.10	-0.10 \pm 0.74	169.2 \pm 5.73	0.20
Västerbotten...	78.92 \pm 3.00	194.6 \pm 5.96	154.9 \pm 5.05	-0.06 \pm 0.69	170.3 \pm 5.86	0.28

THE ARAWAKS OF NORTHERN BRAZIL AND SOUTHERN BRITISH GUIANA¹

CAPT. WM. CURTIS FARABEE, U. S. A.

Formerly with the University Museum, Philadelphia

The original home of the Arawaks of northern Brazil and southern British Guiana, according to their traditions, was in British Guiana between the Rupununi and the Essequibo rivers in Lat. 2°3'n. and Long. 59°1'w. Here are ancient shrines and many mountains bearing sacred names which are associated with the Arawak "Creator" at the time of his residence on earth. One mountain was his dwelling place, another where he kept his dogs or rather foxes that he used as dogs, another where he kept his chickens, another is the stump of the tree of life, another where the people were saved from the flood, etc., etc. Some of their stories, as the Marriage of the Electric Eel assist also in fixing this as their original home.

Today but four tribes remain: the Wapisianas, Atarois, Tarumas and the Mapidians. Some others as the Paravillanas, Parauiens and the Cilikunas have recently become extinct. The Wapisianas number about twelve hundred, while the other tribes are exceedingly small. Representatives of some of these tribes were probably first seen by the Dutch colonists who made trading expeditions up the Essequibo River to the savannah country south of the Pakaraima Mountains early in the eighteenth century. In 1738 Nicholas Horstman sent in search of a passage to the Amazon crossed the divide and reached the Rio Negro. At that time the Macusi, a Carib tribe, were living in the savannah about the fabled lake Amucu and north of the Takutu River, while the Wapisianas were in the territory immediately to the south of them. Richard Schomburgk in 1835 found these tribes in the same relative positions and they remain today in about the same localities. The territory occupied at present by the Wapisianas, lies between Lat. 2° and 3°n. and Long. 58°30' and 63°30' w. It is a long narrow

¹ Part results of the Amazon Expedition (1913-16) of the University Museum. For general account see the *Museum Journal*, 1916, VII, 210, et seq. Also articles in March 1915, March 1917 and March 1918 numbers.

belt crossing the low divide between the Atlantic and the Amazon waters. The numerous rivers are full of fish and in earlier times there was an abundance of deer; even today one sees many of them as he rides across the savannahs or paddles along the rivers.

The Wapisianas are great fish eaters. They have invented several varieties of fish traps and have discovered a dozen or more poisons which they use in the pools during the dry season to kill the fish. At this season, when the water has ceased to flow in the rivers, the fish will not take the hook and it is necessary to poison the water to get them.

The people live along the streams near the forests thus taking advantage of the open savannah for their house sites, the streams for highways and for fishing and the forests for hunting. Their fields are often a long way from their homes in the cleared forests. Some Wapisiana villages are found at the edge of the forests north of the Uraracuera River in the northwestern extremity of the savannah, but none of the people live in the depths of the forest.

Their rectangular houses are built on poles with walls of adobe and roof of palm leaves. There are two doors, one for the men and one for the women. During mosquito time the doors are closed with palm leaves rendering the house mosquito proof. The walls are necessary because of the cool nights and the wind and rain storms which sweep across the savannahs.

The Atarois do not exist as a separate tribe and no longer speak their own tongue. They have been completely absorbed by the Wapisianas whose language is in common use. Very few can speak their old language and it is destined to become extinct with the present generation. There are but three purebloods remaining, a man and two women. As the man is related to the women and cannot marry either of them, there can be no more purebloods. Not more than a hundred half bloods remain. In another generation a traveler passing through the country will not hear of the Atarois, even the name will have been forgotten. All will be Wapisianas. Physically, linguistically and culturally the Atarois are so closely related to the Wapisianas that no noticeable impression will be made upon them or their culture.

The Atarois have remained in their traditional home and have no stories of migration. They are located near the central part of the territory occupied by the Arawaks. One hundred years ago or more perhaps they held all the savannah land in British Guiana south of the Kanuku Mountains.

The Tarumas were first reported by Favella in 1668 when he met them on the lower Rio Negro. They assisted in building the first town on that river, Fortaleza da Barra, the site of the present city of Manaos. The next account of them came from a Carib chief who visited Demarara. He said they lived on the upper Essequibo River, that they were amphibious, living in caves under the water to which they retreated upon the approach of strangers. They have a tradition that they came from the south in recent times. No doubt they crossed from the lower Negro to the head waters of the Essequibo and the Cuduwini. None remain on the Negro to furnish information or tradition.

As they live in the forests entirely their culture differs somewhat from that of the Wapisianas and Atarois. Their houses are built without adobe walls. The thatched roof continues to the ground either with or without a wall. They make the same type of wood-skin or bark canoe as that of the Wapisianas but do not use the plank canoe. They make a small sharp pointed dugout which is used particularly for fishing. They are the greatest fish eaters of all the tribes. The Essequibo continues to flow through the year and contains no stagnant pools. The fish take the hook in running water hence the Tarumas seldom use poison. They have abundance of forest game and pay less attention to agriculture. They plant cassava and a little corn but have no beans, melons or pumpkins.

The Mapidians live in the forests just north of the Equator on the headwaters of the Rio Trombetas, in Brazil, some two hundred miles from their ancestral home. They have a tradition that they are related to the Atarois and that a long time ago they left their former home, crossed the Akarai Mountain to the Apiniwau River and later made their way to their present home. The Atarois also have a tradition that a part of their people departed in a body towards the east and were never heard of again. Their language is more closely related to Ataroi than to either Taruma or Wapisiana. The Tarumas now occupy the territory between the Atarois and the Akarai Mountains. It would appear then that they came into this region after the Mapidians had passed through to the east.

Not more than a hundred Mapidians remain and, no doubt, many of them are only half bloods. The tribe is so small that they can no longer adhere to their old customs and they are beginning to marry outside of the tribe. The son of the present chief has recently taken two Diau girls as wives because there were no cousins for him to marry.

Their culture has been somewhat modified by the environment and by their Carib neighbors by whom they are entirely surrounded. Living on the high land about the heads of small streams, they get few fish and care less for them than do their kinsmen to the west on larger streams. They pay more attention to agriculture and have better fields. They have adopted the music and the dance of the Caribs. The women have also adopted the method of wearing the hair in the dance and the beaded loin apron. These changes are no doubt due to the presence of Carib women brought in by the men as wives. None of these tribes of Arawaks had any songs of their own originally. All agree that the few songs they have were borrowed from the Caribs who have many songs and a better appreciation of music.

These Arawaks are exogamic in their marriage relations and the husband takes his wife to live with him in his father's village. Inheritance is thus in the male line. According to custom a man marries his first cousin who must be either his father's sister's daughter or his mother's brother's daughter, due to the fact that he cannot marry within his own group. He may have a choice between several cousins or there may be but one near his own age when he arrives at maturity. In such a case they are spoken of as husband and wife even when they are small children and the girl's father calls the boy "son-in-law." Marriage takes place soon after the girl reaches puberty. There is no ceremony, nor any formal announcement of the marriage. Usually a man takes his wife at the time of a great feast and dance without any previous arrangements having been made. He does not even consult the girl's father. The first evidence is given when a woman goes out with a man and follows his trail or renders him any service. In payment a man must work for his father-in-law for a short period. He may assist in clearing the forest and making a new field or he may give an equivalent. The most favored time for marriage is at the end of the rainy season which coincides with the planting time. This is the time also when the son-in-law's services are the most desired. He makes a field for himself either before or soon after his marriage.

A man is allowed to have two wives who are either sisters or cousins. About the time the first child is born the wife suggests to her husband that he had better take another wife because there is so much work to be done—the fields are to be cultivated, the cotton spun, hammocks made, etc. His wife advises him also which girl to take—her younger sister or her cousin—saying that they would get on well together. The first wife is master of the household and does less of the outdoor

work. She has general oversight of both sets of children who grow up as one family. Each wife has her own fireplace and cooking utensils and each furnishes a part of the food for the combined family which divides itself into two parts according to sex.

As soon as the boy leaves his mother's breast, at the age of three or four years, he eats and lives, works and plays with his father and brothers. The girls eat and live with their mothers. When a meal is cooked and ready to serve, the women and girls carry it to the end of the house near the men's door and retire while the men and boys eat. Whatever remains is afterwards carried back to the women's part of the house where it is devoured by the females and dogs of the household. A man may eat with his wife when alone but not if anyone else is present.

By this method the boys and girls are kept separated during childhood. They never play together, work together or eat together. They are never seen together until after they are married. It is no doubt due to this custom and to that of early marriage that illegitimacy is unknown among them. It is interesting to note also that infidelity is equally unknown. Separations do occur but for other causes.

From the physical measurements and photographs it will be seen that these people are a strong virile race, despite the fact of inbreeding which has been going on for unnumbered generations. One very curious fact is noteworthy which may or may not be the result of this custom of cousin marriages. There are a great many more women than men among them. They say there are two women to every man. Mr. Ogilvie, who has lived among the Wapisianas for many years, says that nearly two-thirds of the whole number are females. He is now making an exact census of this tribe and the Atarois which will be published when received.

It is remarkable that there is so little evidence of discord or jealousy between the wives of the same husband. In the twenty-four years that Mr. Melville has been intimately acquainted with the savannah tribes he had heard of but two cases of serious difficulty and both of recent date. Two women committed suicide because their husband showed favoritism for the other wife. One woman first killed her three children. The method used in these cases, of murder and suicide was that of hanging.

Divorce may take place without ceremony and at the will of either and no punishment follows. But the power of public opinion against

desertion or separation is so great that few cases occur. The most intimate relations are freely discussed in public hence everyone desires favorable consideration. The whole method of control in their social system is the quiet force of public opinion.

Near the time of delivery a pregnant woman must remain at home and refrain from certain kinds of food. They understand the main facts concerning conception and know the period of gestation is nine moons, but in an individual case no record is kept. When a woman realizes that her period is nearly run, she sends for her mother, aunt or married sister who acts as midwife. She is delivered sitting astride a hammock which has been cut lengthwise in the middle. The midwife receives the child through this slit underneath the hammock. Together they cut the umbilical cord with a bamboo knife, having first fastened the split reed of an arrowshaft over the cord. The mother then bathes the child and herself while the assistant carries away the placenta and buries it. The mother remains in the house for a month and assists with the work.

It seldom happens that twins are born, but they are considered a good omen and the parents are very proud of them. Nursing of children is prolonged to three or four years. The child is kept in a hammock until it can sit up, when it is placed on a mat on the floor. About the house, the baby is carried astride the mother's hip, but on the trail it is placed in a broad band of bark or woven cotton cloth worn as a bandoleer by the mother. The baby sits in the loop in front of the mother's left arm with his legs together against her body. In this position he cannot fall out and it leaves her hands free and her back for the packbasket which is carried by a tumpline of bark from the forehead. The children are treated with great care and kindness and fondled by the parents, but never kissed.

These tribes practice that curious custom of couvade. When a child is born the father takes his hammock and keeps it for a month. He must not go out in the hot sun nor perform any manual labor whatsoever. His wife and other women as well bring him the most delicate foods. He must not kill any vicious animal or poisonous snake for a period of two years. In explanation of the customs they say there is some mysterious physical relation existing between the father and the child by which the latter would be affected by his eating coarse or strong foods to the same extent as though it should eat them itself.

In case of death no visible signs of mourning are worn. For a month after a husband or wife dies, when relatives or intimate friends are met, they speak of the dead in endearing terms, weep and wail for about a quarter of an hour and then break off suddenly to talk and laugh before the tears are dry. The widow remains in the village with her daughters and marries again very soon or she may go back to her own people. Her sons go to their father's eldest brother or to a near male relative on the father's side. Children are not a handicap to remarriage but rather an asset because they are good workers and pay their way even when quite small.

A man never dies a natural death and would live forever if it were not for the Kenaima or evil spirit which is always lurking about to kill him. Sickness and diseases are due to the evil influences of a medicine man of another tribe in another village. It thus becomes necessary for each group to have a medicine man to counteract the evil done by another. He does not inherit his position or powers but receives a visit from the good spirit which tells him that he is to be a medicine man and also what he must do to obtain strength. He drinks tobacco juice until he is overcome when he sees visions and receives strength but he must spend some time with another of his profession in order to learn the incantations and practices of their art. As they administer no medicines and have no surgery, a long period of training is unnecessary. The greater part of their practice consists of diagnoses and taking note of symptoms in which they are experts. When a patient appears with any infirmity the medicine man drinks tobacco, sees visions and tells the patient what is wrong. He then passes his hands over the ailing part and says he has removed a worm, a stick or a fragment of bone and that now the patient will recover.

All these things which cause sickness and pain are sent by the outside medicine man, whose spirit may leave his body and travel at will to do injury. The list of the things that he is able to do gives a very good idea of the diseases from which they suffer most. He may blow upon a man's hammock and cause backache, or on his carrying basket causing sores, or on his tracks after he has gone to his field and if he should step in the same tracks returning his feet and legs and body would swell up and he would die. He may blow upon spittle causing sorethroat or lung trouble. Our interpreter's father died from "spitting blood" on this account. If he blows upon urine the man will urinate blood and die or if on excrement the man will die from dysentery. Stomach and bowel troubles are caused by his placing the

power of an evil herb upon food or food plants. This gives us, besides the stomach and bowel troubles, rheumatism, beri-beri or something akin to it, tuberculosis, haematuria and dysentery as the most serious diseases common among the tribes.

In our short stay we saw none of these diseases except diarrhea and dysentery. On the whole these Arawaks are a very healthy people. We saw many evidences of injuries of various kinds, for the most part on hands and feet. Some were due to the ordinary accidents in connection with labor and travel and others to bites and stings of animals, reptiles and insects. One had a stiff hand from the bite of a poisonous snake and two had lame feet from the stroke of the stingray.

There was one case in a boy of about eighteen years of lateral curvature of the spine. Five cases were noted among the Wapisianas and one among the Mapiadians and Tarumas of deaf mutism. No case of albinism was observed and none had ever been seen by our informants.

Their senses of sight and hearing appear to be more acute than is common among other tribes. It may be due to the exercise of concentrated attention in the savannah country where distances are greater than in the forests. Their sense of location was a continual surprise to me. When hunting in the thick forests and running after game in circles around trees, etc., they are always able to take a straight course back to camp. They never get lost. Other tribes with whom I have hunted in similar conditions make a habit of breaking branches as they run and are thus able to follow the same trail back to camp. We took four boys with us for six months on a journey over the Akarai Mountains across the headwaters of the Trombetas and down the Corentine River. After four months of wandering through the forests in new territory they were able to orient themselves perfectly. They were constantly saying that we were opposite some familiar place in the savannah or on the Pupununi and that they could walk across in so many days if there were a trail. From our own astronomical observations they were never far wrong at any time.

The postures habitually assumed when at rest differs with the sex. The men squat on their heels, sometimes they place a small stick under their heels to lift them up. When eating they squat around the cooking pot. The women drop first on their knees and then sit back on their feet with the toes turned in, or they sit flat on the ground with one leg straight and the other bent with the foot close between the thighs. Men often stand on one foot with the other resting against the opposite leg above the knee. Both sexes squat to urinate.

Men and women are well developed but neither fat nor muscular. Both have great endurance, carrying heavy packs for long distances, or paddling their canoes day after day in rapid water. They are good long distance runners, but have no races. The only physical contest found among them is that which takes place at one of their big dances, when the invited men, one at a time, rush the entrance to the house, which is guarded by strong men, and engage in most interesting wrestling bout in which the victor succeeds in lifting his opponent free from the ground—he does not attempt to throw him down but to lift him up, a more difficult performance.

In personal appearance their features are rough but not uncomely. They are scrupulously clean in their habits of life. They bathe at least twice a day. Among the Mapidians men, women and children bathe together. The dogs also have their daily bath—they are kept on platforms in the house. Refuse is carried away from the house and burned. There are no offensive odors about one of their villages.

The savannah dwellers and also their relatives in the forest are noticeably darker in skin color than the surrounding forest tribes. Their hair while black is fine and particularly among the Tarumas and Mapidians may be slightly wavy. The men wear the hair long and confined in decorated tubes of bamboo while the women wear theirs loose or in a knot over the eyes. At puberty a girl cuts off her hair and wears a white head band until after marriage. They have very little hair on the body, even on the pubis or under the arms. Nearly all the men have some hair on the lip and a few have scattering long hairs on the face. Both sexes extract the eyebrows.

In the way of body mutilations, all pierce the ears, septum of the nose and the lower lip. The men file the front teeth to a point. The young women who chew the materials for making intoxicating drinks have lines tattooed about the mouth, one across the upper lip to the corners of the mouth, another correspondingly on the lower lip and one from each corner of the mouth across the cheek. The head is not artificially deformed. The Wapisianas and Atarois are beginning to give up some of these customs.

The total population of these four Arawak tribes is less than fifteen hundred and rapidly decreasing according to accounts of the savannah tribes, due to changed economic conditions and introduced diseases. Several tribes have disappeared within the past hundred years. The Wapisianas number about 1200, the Atarois with half bloods 100, the Tarumas about 50 and the Mapidians less than 100.

The nominal size of the family is difficult to determine. The children that die in infancy are soon forgotten. Infanticide has been practiced but apparently is not common. The old Mapidian chief, who has two wives living and two dead said that he had killed some of his first children by tying a cord about their necks, because he did not want them then, but he did not remember how many he killed. Many children die young. The relative number of children to adults is best shown by the populations of some of the villages as follows: 9 men, 11 women and 14 children; 12 men, 15 women, and 17 children, etc.

COMPARISON OF MEASUREMENTS

The Mapidians are the tallest of the tribes, with an average of 161.5 cm., the Tarumas next in height, at 159.6 cm., while the Wapisianas and Atarois are the shortest, at 157.3 cm. The Mapidian women at 148.8 cm. are taller than the Tarumas women at 146.1 cm. The Mapidians also show a greater range of variability than the other groups; the shortest and the tallest individuals are found in this tribe. The Wapisianas appear to be relatively slightly longer bodied than the other groups; the height sitting index is about one point greater. The Wapisianas have also a higher span-height index. The Tarumas have longer hands, feet and third fingers than the Wapisianas. In chest measurements the Tarumas excel in both depth and breadth and are relatively deeper chested. They have also broader hips. Actually and relatively the women have broader hips than the men. Their shoulders are 2.6 cm. narrower but their hips average 0.6 cm. wider. In head form there is little variation between the groups or individuals, with an average index of 80 for men and 81.1 for women. The Wapisianas have a longer head and a rounder face than any other group but the differences are not great; they have a broader nose also.

In a comparison between male and female measurements and indices it will be noted that there is remarkable agreement in bodily proportions. For most part there is less than one point of difference in the indices. The females have relatively broader hips, heads and faces but narrower hands and noses.

For most part the measurements secured were those usually taken but some remarks seem necessary. Every field worker knows the difficulties encountered when dealing with the less civilized tribes. There is little trouble in getting photographs because the instrument does not touch the person, but measurement is a different problem.

The operation itself is sometimes difficult. There are no floors and the ground is uneven, which affects all height measurements. The sitting height is next to impossible to get with any degree of accuracy—there are no boxes, the ground is too low, and a log—is round. Shoulder, hip and chest dimensions are accurately taken, because the people wear no clothing. The shoulder measurement taken is the biacromial breadth, the hip measurement the maximum biiliac breadth. It is regrettable that so few individuals were measured. At the time of our visit we took advantage of every opportunity and expected to return to the Wapisianas for further study, but were unable to do so.

Later the writer expects to publish data of similar nature from other regions visited by the expedition, which afford a ground for comparisons.

The writer wishes to acknowledge his indebtedness to H. P. C. Melville for information and photographs; to John Ogilvie, his companion in the field, who assisted in getting measurements, photographs and information and without whose aid the journey to the tribes could not have been accomplished, and to B. W. Merwin for working out tables and indices.

ABSTRACT OF MEASUREMENTS¹

MALES

	AGE	HEIGHT	HEIGHT SITTING	HEIGHT SITTING— STATURE INDEX	HEIGHT TO SHOULDER	HEIGHT TO MEDUS	LENGTH OF ARM	ARM LENGTH—STATURE INDEX	LENGTH OF FOREARM	LENGTH OF FOREARM— STATURE INDEX	SPAN	SPAN—STATURE INDEX
		cm.	cm.		cm.	cm.	cm.		cm.		cm.	
Wapisiana:												
Aver.....	30	157.3	81.6	51.9	127.6	60.7	68.1	43.5	44.3	28.3	66.2	105.5
Min.....	21	152.5	78.5	49.7	123.3	58.0	61.0	39.2	42.0	27.1	160.0	101.9
Max.....	40	163.4	88.5	53.5	131.1	65.3	72.1	45.1	46.9	29.4	173.7	109.7
Taruma:												
Aver.....	40	159.6	81.3	50.9	133.4	60.0	73.3	45.9	44.6	27.9	166.2	104.7
Min.....	23	151.4	77.7	49.2	126.5	52.5	69.3	42.4	41.1	26.5	155.8	98.6
Max.....	60	169.3	88.5	53.0	140.9	69.4	80.2	48.8	48.1	29.3	176.7	108.4
Mapidian:												
Aver.....	36	161.5	82.0	50.7	—	—	—	—	—	—	169.8	104.6
Min.....	25	150.4	76.3	48.4	—	—	—	—	—	—	159.2	102.3
Max.....	55	171.5	87.0	54.9	—	—	—	—	—	—	180.0	105.9
Total:												
Aver.....		159.4	81.9	51.4	130.5	60.4	70.5	44.6	44.2	27.8	167.1	104.7

	HEAD				FACE						
	Length	Breadth	Cephalic index	Minimum frontal	Height ment.- erin.	Height ment.- nasion	Diam. bizygom. max.	Height prosth.- nasion	Upper facial in- dex	Lower facial in- dex	Total facial in- dex
	cm.	cm		cm.	cm.	cm.	cm.	cm.			
Wapisiana:											
Aver.....	18.7	14.8	79.1	10.9	17.6	11.5	14.0	7.0	50.2	96.6	79.4
Min.....	18.1	14.3	77.1	10.2	16.3	11.0	13.6	6.6	46.8	90.3	74.3
Max.....	19.3	15.7	84.4	11.6	18.7	12.4	14.7	7.4	53.7	102.7	84.3
Taruma:											
Aver.....	18.4	14.9	80.9	10.3	18.3	11.8	13.9	7.4	53.1	88.5	76.2
Min.....	17.8	14.3	77.3	9.5	16.9	11.2	13.3	6.6	46.7	83.2	70.2
Max.....	19.0	15.6	84.0	11.3	19.7	13.4	15.2	8.2	58.8	93.7	83.4
Mapidian:											
Aver.....	18.3	14.6	79.8	10.6	—	—	13.8	7.3	53.0	—	—
Min.....	17.4	13.2	79.6	9.3	—	—	12.9	6.4	46.7	—	—
Max.....	18.9	15.6	84.1	11.2	—	—	14.5	7.8	56.1	—	—
Total:											
Aver.....	18.5	14.8	80.0	10.6	18.1	11.8	13.9	7.3	52.5	91.0	76.8

¹ For explanation concerning the less well-understood measurements see footnotes on female tables.

MALES 2

	NOSE			BIZY. BREADTH vs. BREADTH OF HEAD	BREADTH BIGON- IAL	BREADTH OCULAR (BET. PUPILS)	BREADTH OF MOUTH	HEIGHT OF MIGHT EAR	BREADTH OF SHOULDERS	CHEST: (AT NIPPLE HEIGHT)		
	Height	Breadth	Nasal index							Breadth	Depth	Chest index
	cm.	cm.		cm.	cm.	cm.	cm.	cm.	cm.	cm.	cm.	
Wapisiana:												
Aver.....	4.8	4.2	85.9	94.7	11.1	6.7	5.6	6.1	36.9	29.5	22.3	75.8
Min.....	4.6	3.7	74.0	90.9	10.3	6.2	5.1	5.5	35.0	27.2	20.8	69.5
Max.....	5.0	4.6	100.0	98.6	11.4	7.3	6.0	6.9	38.3	33.4	23.4	80.9
Taruma:												
Aver.....	4.9	4.1	83.8	93.9	10.4	6.8	5.6	6.3	36.7	29.8	23.3	77.7
Min.....	4.3	3.5	74.5	91.2	9.9	6.3	4.8	5.6	34.6	28.3	21.4	71.5
Max.....	5.5	5.0	100.0	97.4	11.2	7.6	6.5	7.1	42.2	33.3	24.0	80.8
Mapidian:												
Aver.....	4.8	4.0	84.4	95.6	10.7	6.6	5.4	6.3	—	—	—	—
Min.....	4.3	3.7	73.6	90.2	9.8	6.2	4.7	5.8	—	—	—	—
Max.....	5.3	4.4	97.7	104.6	11.2	7.2	6.1	6.8	—	—	—	—
Total:												
Aver.....	4.8	4.1	84.6	94.0	10.7	6.7	5.5	6.2	36.8	29.7	22.7	76.4

	BREADTH OF HIPS	BREADTH OF HIPS vs. BREADTH OF SHOULDERS	LEFT HAND			LENGTH OF ME- DIUS (LEFT)	LEFT FOOT			LENGTH OF FOOT— STATURE INDEX
			Length	Breadth	Hand index		Length	Breadth	Foot index	
	cm.		cm.	cm.		cm.	cm.	cm.		
Wapisiana:										
Aver.....	30.5	82.8	17.2	8.3	48.5	10.4	25.0	10.2	41.0	16.2
Min.....	28.7	78.6	15.8	7.8	46.4	9.9	22.6	9.6	37.1	14.6
Max.....	33.1	86.4	18.4	8.8	50.0	11.0	26.8	10.9	44.4	16.7
Taruma:										
Aver.....	30.8	83.9	17.7	7.9	44.4	10.7	25.0	10.1	40.4	15.7
Min.....	28.5	82.0	16.0	7.4	39.6	9.7	22.5	9.5	37.6	14.9
Max.....	34.7	88.6	19.1	8.5	50.6	12.0	27.6	10.6	44.0	16.5
Mapidian:										
Aver.....	—	—	—	—	—	—	—	—	—	—
Min.....	—	—	—	—	—	—	—	—	—	—
Max.....	—	—	—	—	—	—	—	—	—	—
Total.										
Aver.....	30.7	83.3	17.3	8.1	46.7	10.5	24.9	10.1	40.5	15.9

ABSTRACT OF MEASUREMENTS

FEMALES

	AGE	HEIGHT	HEIGHT SITTING	HEIGHT SITTING— STATURE INDEX	HEIGHT TO SHOULDER ¹	HEIGHT TO MEDIUS ²	LENGTH OF ARM ³	ARM LENGTH— STATURE INDEX	LENGTH OF FORE- ARM ⁴	LENGTH OF FORE- ARM—STATURE INDEX	SPAN—MAX.	SPAN—STATURE INDEX
		cm.	cm.		cm.	cm.	cm.		cm.		cm.	
Taruma:												
Aver.....	—	146.1	76.4	52.0	120.5	54.8	65.7	45.0	40.7	27.8	153.5	105.2
Min.....	—	145.4	72.0	49.8	118.2	51.2	61.6	42.4	38.7	26.6	147.6	101.5
Max.....	—	147.0	79.6	54.5	122.6	56.6	68.8	47.2	41.6	28.5	158.1	108.7
Mapidian:												
Aver.....	—	148.8	75.6	50.8	—	—	—	—	—	—	153.8	103.3
Min.....	—	146.0	72.7	48.7	—	—	—	—	—	—	145.8	99.3
Max.....	—	153.6	77.9	53.0	—	—	—	—	—	—	157.5	106.5
Total:												
Aver.....	—	147.9	76.3	51.7	120.5	55.6	65.7	44.7	40.4	27.7	153.9	104.0

	HEAD				FACE						
	Length	Breadth	Cephalic in- dex	Minimum frontal	Height ment. —cm.	Height ment. —nasion	Diam. bizy- gom. max.	Height part- ing of lips— nasion	Upper facial index	Lower facial index	Total facial index
	cm.	cm.		cm.	cm.	cm.	cm.	cm.			
Taruma:											
Aver.....	17.4	14.3	82.0	10.1	16.4	10.4	13.1	6.6	50.2	93.4	80.0
Min.....	17.0	13.7	78.7	9.5	15.7	9.7	12.6	5.8	43.3	89.6	74.4
Max.....	17.7	14.9	84.2	11.0	17.2	10.8	13.4	7.3	54.5	100.9	85.3
Mapidian:											
Aver.....	17.3	13.9	80.5	9.9	—	—	12.6	6.7	53.6	—	—
Min.....	16.8	13.6	75.6	9.1	—	—	12.2	6.4	48.2	—	—
Max.....	18.0	14.7	85.5	11.8	—	—	13.5	7.3	59.8	—	—
Total:											
Aver.....	17.5	14.2	81.1	10.0	16.5	10.6	12.9	6.7	52.3	91.4	79.7

¹ Right shoulder, to acromion.² To tip of medius of right hand.³ Span minus breadth of shoulders.⁴ Over elbow to tip of third finger of left hand.

FEMALES 2

	NOSE			BIZY. BREADTH vs. BREADTH OF HEAD	BREADTH BIGN- LAL	BREADTH OCULAR (BET. PUPILS)	BREADTH OF MOUTH	HEIGHT OF RIGHT EAR	BREADTH OF SHOULDERS	CHEST ¹		
	Height	Breadth	Nasal index							Breadth	Depth	Chest index
	cm.	cm.			cm.	cm.	cm.	cm.	cm.	cm.	cm.	
Taruma:....												
Aver.....	4.5	3.5	77.8	91.8	9.7	6.7	5.0	5.6	34.4	28.1	—	—
Min.....	3.8	3.1	70.5	88.9	9.3	6.0	4.5	5.3	33.1	25.9	—	—
Max.....	5.0	3.7	94.7	96.4	10.5	7.3	5.3	6.3	35.9	28.9	—	—
Mapidian:												
Aver.....	4.4	3.5	80.5	94.7	9.5	6.1	4.6	5.6	—	—	—	—
Min.....	3.9	3.1	77.8	88.0	8.2	5.4	4.1	5.0	—	—	—	—
Max.....	5.1	4.0	88.9	99.7	10.0	7.0	5.2	6.2	—	—	—	—
Total:												
Aver.....	4.5	3.5	78.6	93.2	9.6	6.2	4.8	5.7	34.2	28.2	—	—

	BREADTH OF HIPS	BREADTH OF HIPS vs. BREADTH OF SHOULDERS	LEFT HAND			LENGTH OF ME- DIUS	LEFT FOOT			LENGTH OF FOOT— STATURE INDEX
			Length ²	Breadth ³	Hand index		Length (max.)	Breadth (max.)	Foot index	
	cm.		cm.	cm.		cm.	cm.	cm.		
Taruma:										
Aver.....	31.6	91.9	16.3	7.0	43.4	9.7	22.3	9.1	40.8	15.2
Min.....	30.2	88.0	15.1	6.7	39.9	9.4	21.3	8.4	37.7	14.5
Max.....	33.7	95.5	17.0	7.4	47.7	9.9	22.8	9.7	49.7	15.6
Mapidian:										
Aver.....	—	—	—	—	—	—	—	—	—	—
Min.....	—	—	—	—	—	—	—	—	—	—
Max.....	—	—	—	—	—	—	—	—	—	—
Total:										
Aver.....	31.3	91.5	16.2	7.1	43.9	9.7	22.5	9.1	40.5	15.3

¹ At height corresponding to that in men.² From inter-styloid line to end of medius.³ Across knuckles.



OUTER MEN, TARUMAS; MIDDLE MAN, MAPIDIAN.



LEFT, ATAROI; RIGHT, WAPISIANA.

LITERATURE¹

I. ANTHROPOLOGY IN GENERAL. RESEARCH.

EVOLUTION; MAN'S ORIGIN; EARLY MAN

LES PRIMITIVES CONCEPTIONS SUR LA MUTABILITÉ DES ÊTRES VIVANTS. Par Mahoudeau (Pierre G.)—*Revue anthropologique*, 1918, XXVIII, 79-93.

The paper deals with the various interesting beliefs of primitive peoples concerning their origin from some animal, and with primitive notions of transformism. "The idea of mutability of living beings, far from being a recent scientific conception, presents itself as the oldest belief of mankind."

ENVIRONMENT AS A FACTOR IN EVOLUTION. By Darwin (Major L.)—*Eug. Rev.*, 1918, X, 63-70.

A discussion of two recent contributions to the subject. The writer is rather non-committal, though inclining to the opinion that environment in a slow way is an active agency in evolution. The belief, however, that environment produces heritable effects but very slowly is confirmed by a study of the evolutionary processes in Nature. It would seem wise to rely on breeding from the best stock as still being the guiding rule in our efforts to promote progress in the inborn qualities of the race.

FOURTH NOTE ON THE PILTDOWN GRAVEL, WITH EVIDENCE OF A SECOND SKULL OF EOANTHROPUS DAWSONI. By Woodward (Arthur Smith). With an appendix by Smith (Grafton Elliot)—*Quart. J. Geol. Soc. London*, 1918, LXXIII, 1-10, pl. 1.

The Piltdown gravel has already been well described by the late Mr. Charles Dawson (*Quart. J. Geol. Soc. London*, vol. 70, p. 82 and vol. 71, p. 147). Excavations carried on last summer tended to show that the whole deposit is a shingle-bank which may have accumulated within a comparatively short space of time. The wide distribution of the Piltdown gravel as determined by its characteristic brown flints was shown by Mr. Dawson in his map of 1912 (*Quart. J. Geol. Soc. London*, vol. 69, p. 118). It could easily be traced in the plowed fields of the district, but it yielded no fossils, except at the original locality, until the winter of 1914-15, when Mr. Dawson found two pieces of human skull and a molar tooth in surface material from a

¹ Abstracts or reviews by Associate Editors and others will be signed or initialed; those not signed are by the Editor-in-Chief.

field about two miles away from the original pit. The most important fragment is part of the supraorbital region of a right frontal bone. It agrees with the original skull of *Eoanthropus* in mineralized condition and in its unusual thickness. The second fragment is the middle part of an occipital bone. It is less thickened than the corresponding portion of the type specimen; and it is clear that the muscles of the neck must have extended farther up the occiput than is usually the case, a condition already known in Neanderthal man. The tooth is a left first lower molar, agreeing very closely with that of the original specimen of *Eoanthropus dawsoni*. "From the new facts now described it seems reasonable to conclude that *Eoanthropus dawsoni* will eventually prove to be as definite and distinct a form of early Man as was first supposed; for the occurrence of the same type of frontal bone with the same type of lower molar in two separate localities adds to the probability that they belonged to one and the same species." In the Appendix Professor Smith describes the "form of the Frontal Pole of an endocranial cast of *Eoanthropus dawsoni*," and concludes that the new material corroborates the opinion which he expressed with regard to the endocranial cast of the original specimen: namely, "that it presents features which are more distinctly primitive and ape-like than those of any other member of the human family at present available for examination."—G. S. MILLER.

HEREDITY. EUGENICS

RACE BETTERMENT BASED UPON PRINCIPLES OF PHYSICAL AND MENTAL PROPHYLAXIS. By Gordon (Alfred) *N. Y. Med. J.*, 1917, CVI, 153-156.

An article of a somewhat general nature but calling once more in a strong way attention to the dangers, for the progeny and the race, of syphilis and of alcoholism. The extant scientific facts demonstrate the right of every child of the future to be well born, and the sacred duty and obligation toward mankind of every individual is to see that his own germ-plasm is not impaired by preventable poisons. The all-important function of the physician in this connection is self-evident.

PHYSICAL EDUCATION FOR CHINESE WOMEN. By Hosang (Bertha)—*Chinese Students' Monthly*, May, 1918, XIII, 373-381.

A well-written article of anthropological interest. "There is still a vague idea prevalent even today in China that a robust physique among the 'fair sex' is considered undesirable; that an abundance of health and vigorous vitality are indicative of plebeianism, and that more ladylike characteristics are marked by a certain feebleness and languor, so often accompanied by unnatural timidity and self-consciousness. . . . With this era of change and revolution and turmoil, however, there is dawning all over the civilized world a growing sense of human brotherhood, a new sense of sympathy and fellowship and racial solidarity. To cope with the demands and

responsibilities of this coming democracy, China must needs put her women, the mothers and guardians of the Chinese race, in good physical trim, for in the world of tomorrow there shall be no place for the fainting ladies of today. We must keenly realize the dangers of a national decay through the physical deterioration of the people."

RACE RETROGRESSION. By MacNair (Robert H.)—*N. Y. Med. J.*, 1917, CVI, 315-316.

A very sensible paper on the subject of voluntary birth restriction and the bad effects of the practices (abortion) connected therewith on the individual as well as the race, by one who by many of our modern pleasure loving young women would doubtless be looked upon as an "old-timer." The convictions of the author are, that, "it would doubtless be worth the elimination of an enormous pile of modern conventional rubbish if by conforming to the simple requirements of a wholesome natural life more of the physical strength and vigor with less of the tendency to sin against a most generous nature, could be developed into the race of modern man."

PHYSICAL EDUCATION IN RELATION TO SCHOOL LIFE. By Roper (Reginald E.)—12mo, London (Allen & Unwin), 1918, 116 pp.

A well-written treatise, dealing with the problems of growth and health "which are natural human qualities," in their relation to education. Conditions adverse to the physical welfare and development of the child are discussed and the remedies indicated. The whole little book is an able plea and direction for the proper physical development of the child, for its own benefit as well as for that of the nation, and warning against former inertia in England in these directions.

THE PROBLEM OF DEGENERACY. By Tredgold (A. F.)—*Quart. Rev.*, July, 1917, 31-50.

This is an excellent article on the subject by the well-known author. It is a pleasure to read his definitions. He rightly recognizes two forms of degeneracy, the non-heritable, due solely to the action of adverse environment on the somatic cells of the body, and the heritable, or that which affects also the germ cells. In his opinion the term degeneracy should be restricted to the latter class of cases in which case he would define degeneracy as "a retrograde condition of the individual resulting from a pathological variation of the germ-cell." For the somatic modifications arising from a defective environment he would prefer the term "decadency."

The prevention of the perpetuation of the retrogressive variations encompassed under the term of degeneracy is a problem of great moment and the function of restrictive eugenics, and naturally implies a thorough study of the causes of the process. The idea, recently advanced by C. B. Davenport, that degeneracy is not the expression of any new germinal change, but the perpetuation of a defect which has existed in certain strains of the human race from the beginning or from

a Simian ancestry, is wholly untenable. Degeneracy is no mere evolutionary arrest at some particular stage of bodily or mental development, but a progressive retrogression. The theory that retrogressive variations may be "spontaneous" is equally inadequate. The only sound view is that "they are produced by the operation of natural processes and in obedience to natural laws."

The germ-plasm is—there is now very clear evidence to that effect—susceptible to the action of adverse factors in the environment, but its "vulnerability" differs in different individuals, which may be connected with its state of nutrition, with certain diseases, as well as other causes. The changes produced affect the "innate potentialities" of the germ cells, and the tissues of less phylogenetic fixation, such as the central nervous system, will probably be more liable to alterations than others, influencing in turn other organs. The most common clinical manifestations of degeneracy are in fact those which are commonly grouped under the term "neuropathic diathesis," the varying manifestations of which are doubtless due to particular environmental factors operating on the individual.

The somatic "stigma of degeneration" are abnormal anatomical variations which may be present in physiologically and mentally normal persons; but they are commoner in victims of the neuropathic diathesis, and "the presence of numerous stigmata is so commonly associated with other signs of germinal impairment which is transmissible—of true degeneracy, in fact—as to be extremely suggestive of that condition."

What effect have the degenerates upon posterity? Those of the more pronounced degrees are usually sterile; while those of lighter grades appear to transmit defective constitution not in a Mendelian fashion, but more or less to all their progeny. The mating of a person suffering from a milder degree of germinal impairment with healthy stock might possibly, after a few generations, lead to the eradication of the impairment and so to regeneracy; but in cases of more pronounced germinal impairment "it seems highly probable not only that mating with healthy stock is powerless to neutralize the defect, but that there is the greatest danger of a considerable reduction of the mental vigor and durability of all the offspring and consequently of a marked decline in the net capacity of the community." It is by such means that a whole nation may be conceived to lose not only its power to advance, but also to successfully compete against others and so sink to a lower plane. And "when we take into account the neutralization of the force of natural selection which occurs in a civilized as opposed to a more barbarous community, and which prevents the elimination of these unsound members, it is not difficult to understand how it has come about that nations which have reached a high degree of civilization should in course of time have been overrun by a horde of barbarians. For with nations, as with individuals, it is the 'fit' who survive."

For Great Britain, the problem of degeneracy is aggravated by the war, and will demand the closest attention in connection with all schemes for the restoration of the nation.

PATHOLOGICAL HEREDITY: ON FRAGILITAS OSSIUM AND ITS ASSOCIATION WITH BLUE SCLEROTICS AND OTOSCLEROSIS. By Bronson (E.)—*Edinb. Med. J.*, April, 1917, 240-281.

This is an interesting report of two Scotch families in which hereditary fragility of the bones occurred, associated with other abnormal conditions. The condition "is characterized by defective cranial ossification and by numerous fractures without violence. The earlier the onset the greater is the liability to fracture. Dislocations also occur. Blue sclerotics may or may not be associated." The causation of these conditions is as yet unknown. In a limited number of cases the hereditary factor is in evidence.

The article is accompanied by an exhaustive bibliography of the subject.

MAN'S VARIATION: OSTEOLOGY

MALFORMATIONS CONGÉNITALES OSSEUSES; MULTIPLES ANOMALIES DE L'OMOPLATE GAUCHE; SCOLIOSE; CÔTE CERVICALE. By Billët (P.)—*Rev. d'orthop.*, Paris, 1914, 3 s. V, 449-452.

Report of a case of a vertical rib (left side), co-existing with a defective development of the scapula of same side, in an otherwise healthy French recruit of twenty years of age.

THE CHEMISTRY OF FOSSIL BONE. By Campbell (J. A.)—*Quart. J. Exper. Physiol.*, Lond., 1917, XI, 127-133.

The paper embodies the results of careful chemical analysis of three mineralized bones—the humerus of prehistoric (Post-glacial) man, a rib bone of a *Diprotodon* from the Pleistocene deposits of Australia, and a scapula with an astragalus of a seal referred to the same period as the human bones. Appended are Zalesky's Analyses of normal dried macerated bone, and Hoppe Seyler's Analyses of normal undried bone.

The results show no conditions of special value, outside of giving us so many additional records of the composition of bones found under certain conditions.

DEUX CAS D'ARRET DE DÉVELOPPEMENT DU FÉMUR. UN CAS D'ABSENCE CONGÉNITALE DU RADIUS. By Codet-Boisse—*Rev. d'orthop.*, Paris, 1914, 3 s. V, 437-447, 9 fig.

The author reports a remarkable case of arrested development of a femur in an otherwise healthy and well-developed female infant of French parentage. The family history shows nothing abnormal, and there were no accidents during gestation or delivery. With the help of a radiogram it is ascertained that the left femur measures 14.5 cm.,

the right only 4 cm. in length. The distal epiphysis is 2 cm. broad in the normal left bone, but scarcely 1 cm. broad in the defective one. The knee articulation on the side of the defective femur shows a normal conformation. The leg and foot are perfectly normal. The upper end of the defective femur ends in a sort of a hook, situated quite apart and high above the articular cavity, which itself is very imperfectly developed. The left cavity is also imperfectly formed. And there exists already a plainly developed coxofemoral luxation. The pelvis is quite symmetrical and the rest of the skeleton is normal. In many respects the case resembles those previously reported.

A second case described by same author is that of a partial arrested development of the right femur in a six-year-old girl of French parentage. This child also is otherwise well-developed and there is no adverse family history. The right femur is shorter as well as more slender than the left; the length of the right bone is 25.5 cm. that of the left 32.0 cm. There are no traces of any inflammatory or other lesions, or of paralysis, and the case appears plainly to be one of congenital aplasia of the right femur, without alterations in the form of either its shaft or its extremities.

The causation of these abnormalities is difficult to determine; but in the second case the author is inclined to favor the theory of a defective position of the lower part of the body during gestation.

A congenital complete defect of the right radius is reported by the same author in an otherwise well-formed boy of four years of age, of healthy parentage. The right hand has but four fingers, the thumb being completely absent, together with its metacarpal. The forearm is held at right angles to the arm but can be readily flexed; it is shorter than that of the opposite side by about 4 cm. A radiogram shows a complete absence of the radius, with the exception of a small hard mass attached to the upper part of the ulna; this is the only vestige of the missing bone. The child was born with the umbilical cord wound in a peculiar fashion about the defective forearm, which the author believes was a sufficient cause of the abnormality. A similar condition might possibly have determined the defect of the femur in the first case of his report.

A CASE OF CONGENITAL ABSENCE OF THE FEMUR AND FIBULA. By Quesada (R.)—*West Lond. M. J.*, 1918, XXIII, 29-30.

Report of a case of a congenital absence of both femur and fibula in the left lower limb of a man of fifty years of age, "sent to the Kensington Infirmary with a diagnosis of dislocated hip." The man was 5 feet 10 inches tall and in general quite well developed. The left lower limb was 20 inches shorter than the right, but the man was able to walk with the aid of a boot and an ordinary peg, until he fell and had to be brought to the Infirmary. "All the anatomical landmarks are lost around the hip. The skiagram of this region . . . shows a normal acetabulum, with a small roundish nucleus of bone above it and resting very near the ilium. This nucleus probably represents the

head of the femur. Practically the whole of the shaft, as well as the neck of the femur, are missing, but the condyles, together with a small piece of the lower end of the diaphysis, are present. The tibia, which is normal, articulates with the condyles. The fibula is absent, although there is an external malleolus."

SUR UNE VARIATION ANATOMIQUE DU METACARPIEN II. By Dubreuil-Chambardel (Louis)—C. R. Acad. Sc., Paris, 1918, CLXVI, 262-264.

Description of an exceedingly rare anomaly discovered by the author in a skeleton of a male Frenchman fifty years of age. The II Metacarpal of each hand is formed of two distinct parts, articulating with each other and joined by ligaments. The bone as a whole preserves the usual form and dimensions. The two parts are unequal, the distal portion constituting on each side four-fifths of the bone. Their articulation is an enarthrosis, the articular surfaces almost flat. The anomaly is explainable as "a want of fusion between the primary point of ossification of the diaphysis and the secondary one of the proximal epiphysis of the bone." The metatarsals of the skeleton are lost, so that it is impossible to say whether or not they showed any abnormality.

SKIAGRAM SHOWING ABNORMAL SESAMOID BONES IN FEET. By Ellis (E.)—*Med. J. S. Africa*, 1917, XIII, 63.

In a miner twenty-nine years of age a skiagram showed the existence just behind the right astragalus of a small bone, one-third of an inch long and about one-fourth of an inch wide; and also an united epiphysis at the base of the fifth metatarsal on the same side. The extra bone behind the astragalus is probably the so-called "os Japonicum" which is developed from a separate center of ossification and joins the astragalus normally at about the eighteenth year. The author's original impression that the extra bone might have been a sesamoid bone is not upheld in the discussion.

WOLFF'S LAW OF BONE TRANSFORMATION. By Keith (A.)—*Lancet*, Lond., 1918, I, 250-252.

The author discusses somewhat in extenso the Wolff's law of bone transformation, which postulates that "every change in the form and the function of a bone or of its function alone, is followed by certain definite changes in its internal architecture, and equally definite secondary alterations in its external conformation, in accordance with mathematical laws."

Doctor Keith shows that in substance this opinion was held as far back as 1834 by Chas. Bell, while in other lines Wolff's observations were antedated by those of Hunter, Flourens, and others.

Doctor Keith further calls attention to the importance, particularly in orthopaedics, of a study of the properties of osteoblasts.

THE LAWS OF BONE ARCHITECTURE. By Koch (John C.)—*Amer. J. Anat.*, 1917, XXI, 177-298.

This is an elaborate, profusely illustrated paper on a detailed mathematical analysis of the structure of a femur of a man in normal health who was accidentally killed and whose weight was 200 pounds. The results according to the author confirm Wolff's theory of the functional form of bone, with its "corollary of the functional pathogenesis of deformity." The conclusions are that:

"1. The normal external form and internal architecture of the human femur results from an adaptation of form to the normal static demands, or normal function of this bone.

"2. The proportions of the femur are everywhere such as to show a definite mathematical relationship between the body weight, and the internal structure of the bone: there is a definite relation between the structure and the stress at every point.

"3. Spongy bone is homogeneous with compact bone as a structural material and differs from it mechanically only in possessing smaller strength approximately in proportion to its density as compared with compact bones.

"4. The femur has a factor of safety of 5.68 for the stresses due to running, 11.36 for the stresses due to walking, and 30.30 for the stresses due to standing. The weakest section for resisting the stresses due to loads on the femur-head is in the neck of this bone.

"5. The structure of the femur is based upon the mathematical requirements of mechanics and the inner architecture is such as to produce great strength with a small amount of material and the disposition of the material at all points corresponds to the stress requirements at those points.

"6. The general law of bone, the adaptation of form to function, holds true mathematically and mechanically in the normal human femur, and therefore for all other normal human bones. . . .

"The thickness and closeness of spacing of trabeculae in bone vary directly with the intensity of the stresses transmitted by them."

It would be interesting if the author extended his studies to femora of the several distinct types which occur in man (see "Typical Forms of Shaft of Long Bones,"—*Proc. Assn. Amer. Anat.*, 14th Sess., 1900, 55-60), and also to those of different structure (see Foote, J. S. "Comparative Histology of the Femur," *Smiths. Contr. to Knowl.*, 1916, XXXV, No. 3).

[THE HOMOLGY OF THE SACRAL ARCH IN MONOTREMATA WITH THE SUPERIOR SACRAL FORAMEN IN MAN.] By Mijsberg (W. A.)—*Nederl. Tijdschr. v. Geneesk.*, Amst., 1918, I, 199-201.

The author discusses the subject and is inclined to admit such a homology.

JAWS AND TEETH

THE RESULTS OBSERVED IN A FURTHER STUDY OF PRENATAL CAUSES OF DENTOFACIAL DEFORMITIES. By Weinberger (B. W.)—*Internat. J. Orthod.*, St. Louis, 1918, VI, 1-23, 26 figs. Also in *Dental Items of Interest*, N. Y., 1918, XL, 6-33.

The author devotes his attention to the study of the causation of various disharmonies of the dental arches and teeth, and reaches the following main conclusions:

"Both dental and medical textbooks concerning the dental arch at birth are at present misleading students and are contrary to careful observations.

"We have malrelation of the dental arches, malformations, and conditions to contend with prior to birth, varying in a marked degree. Thus we find malocclusion in the deciduous teeth.

"A great many early abnormal conditions will, undoubtedly, be found to be the result of mechanical disturbances, the result of amnion pressure.

"During development the skeleton is markedly influenced by internal secretions, affecting growth or general nutrition of the body, tongue, jaws, and the teeth."

VARIATION: RACIAL

ESTUDOS DA ETNOGENIA PORTUGUÊSA. CRANIOS BRAQUICÉFALOS. By Correa (A. A. Mendes)—*An. Sc. Fac. Medic. Pôrto*, 1918, IV, No. 2; repr. 80 pp., 2 pl.

This report, which represents considerable work, gives special attention to the presence of brachycephaly in Portugal, from the preneolithic to present times. Brachycephaly occurs from the Azilian period, but never in great proportions. These proportions oscillate from time to time, augmenting with new immigrations, and diminishing during the intermediary periods through absorption into the more prevalent dolichocephalic type.

The broad headed type is in general related to that of *H. alpinus*; its identification with definite ethnic groups is still uncertain.

THE MODERN ENGLISH SKULL. By Parsons (F. G.)—*Lancet*, Lond., 1918, I, 557-560.

The author calls attention to the curious fact, "that one of the skull forms of which we know least is that of the modern Englishman"—the reason being principally the usual cutting to pieces of such skulls in the dissecting room. To at least partly remedy this defect he gives ingeniously constructed composite figures of six well-identified English skulls, together with a number of others for comparison. He is inclined to the conclusion that "the modern Londoner differs wonderfully little in his head form from his Saxon ancestor, except that he has lost two or three millimetres in his skull length, but that every now and

then he throws back to a typical Bronze Age man like Darwin, or to a typical Neolithic man like Jonathan Wild."

The skull of the modern Englishman appears to him to be nearly pure Nordic.

VARIATION: BODY, LIMBS, SOFT PARTS

A CASE OF ACCESSORY LUNGS. ASSOCIATED WITH HERNIA THROUGH A CONGENITAL DEFECT OF THE DIAPHRAGM. By Cockayne (E. A.) and R. J. Gladstone—*J. Anat.*, 1917, LII, 64-96.

An important paper which not only gives a report of an additional interesting case of the anomaly in question, but deals critically with the whole subject of accessory lungs. It discusses their occurrence as to side, the etiology of the anomaly, the development of lungs in general, and the development of the diaphragm. The author concludes that:

"1. Accessory lungs are derived from the embryonic tissue of the 'pulmonary groove,' or of the 'lung buds.'

"2. A portion of the embryonic pulmonary tissue, after having become adherent to a neighboring part or organ, from which it draws its blood-supply secondarily, may be separated from the parent tissue and grow independently.

"3. The author believes that the small size of the left pleural cavity, and the close relation of the mesodermal lobes of the left lung to the lower end of the oesophagus, would favor adhesion of the lung taking place on this side, and this may account for the greater frequency of accessory lungs on the left as compared with the right side.

"4. It is probable that accessory lungs do not ordinarily originate as a secondary and independent outgrowth from the oesophageal portion of the foregut.

"5. The adhesion of the lung bud to the septum transversum covering the liver, or to the wall of the pleuro-peritoneal passage in typical left-sided cases of accessory lung, may interfere with the normal retraction of the lung bud from the abdomen into the thorax, and cause a persistence of the pleuro-peritoneal opening. We are thus able to explain the occasional intra-abdominal position of accessory lungs, and the association of accessory lungs with left-sided congenital diaphragmatic hernia."

The article is accompanied by an exhaustive bibliography of the subject.

OBSERVATIONS ON THE EXCITABLE CORTEX OF THE CHIMPANZEE, ORANG-UTAN, AND GORILLA. By Leyton (A. S. F.) and C. S. Sherrington—*Quart J. Exper. Physiol.*, Lond., 1917, XI, 135-222.

A very valuable memoir on cerebral localization in the higher anthropoid apes, by the well-known authors. The results deserve to be quoted almost in full:

"The 'motor' area of the cortex in the three species of anthropoids examined (chimpanzee, orang-utan, and gorilla), as determined by

faradisation, embraces almost all of the free surface and a large part of the sulcal surfaces of gyrus centralis anterior; it also extends over the mesial border upon gyrus marginalis for a distance about half-way toward sulcus cinguli, in agreement with Campbell's delimitation of his 'precentral type' of cortex in chimpanzee and orang.

"The proportion of motor area buried in the sulci is probably usually about one-third of the whole area. . . .

"Differences in smaller details of localization exist from individual to individual of the same species, and between the right and left motor areas of the same individual. . . .

"The anterior edge of the motor area seems to fade away somewhat gradually into inexcitable cortex. . . .

"The motor area for face and tongue movements seems, relatively to the rest of the motor area, more extensive in orang than in chimpanzee. Apart from that distinction, there seemed no clear difference between the motor area from species to species of the anthropoids examined. The largest and most highly developed brain we examined was that of a gorilla, and the motor area in that specimen appeared to be, on the whole, the most extensive and differentiated of those experimented upon. . . .

"Stimulation of the middle and posterior parts of the inferior frontal convolution of left hemisphere failed in chimpanzee, orang, or gorilla to evoke any vocalization. Ablation of a large portion of that area in one chimpanzee, chosen because it was a noisy and vociferous animal, produce no obvious impairment or change in vocalization.

"Faradisation of the surface of the insula failed to evoke any detectable results. . . .

"The threshold of faradic excitability of the motor cortex, as tested in the arm area, seems to be practically similar to cat, macaque, and chimpanzee. . . .

"The anthropoid brain, unlike the brain of the smaller monkeys, has frequently a circle of Willis of human pattern."

DEMOGRAPHY

IMMIGRATION IN 1917. Based on the *Annual Report of the Commissioner General of Immigration, 1917.*

During the past ninety-eight years there have come to the United States 32,948,353 immigrants. Starting with 8,385 in 1820, the yearly number has been rapidly increasing in waves with apices in 1854, 1873, 1882, 1892, 1907, 1910 and 1914. Interspersed among these intervals of high frequency have been corresponding periods of retarded immigration in 1862, 1878, 1886, 1898, 1909, 1912 and the present depression commencing in 1915. The high tide of immigration was in 1907, when 1,300,000 individuals arrived. This number was nearly equalled in 1914 when about 1,200,000 immigrated.

At least 75 per cent of the thirty-three million immigrants have come from Great Britain and Ireland, Germany, Italy, Austria-Hungary

and Russia. During the last thirty years there have been noticeable changes in the sources of our immigrants. There has been a steady increase in the numbers coming from Italy, Austria-Hungary, Russia, Turkey, Mexico and Canada, and a corresponding decrease from Germany, Great Britain, Scandinavia and Japan. The number of those coming from Greece, Portugal, France, Belgium, West Indies and Roumania has fluctuated very little from year to year.

Effect of the War on Immigration in 1917

During the immigration year ending in June, 1917, 295,403 immigrants arrived, a decrease of 1,040,204 compared with 1914 and of 3,871 compared with 1916. The War has not produced any noticeable effect on immigration from Canada, Mexico, West Indies, Greece or Japan but has conditioned a tremendous decrease from the belligerent countries. Comparing conditions of 1914 and 1917 we find that immigration from Russia has decreased from 291,040 to 12,716 annually, from Great Britain a decrease from 82,204 to 16,141, from France from 9,296 to 3,187, from Italy from 283,738 to 34,396, from Germany from 35,734 to 1,857, from Austria-Hungary from 278,152 to 1,258 annually.

Composition, Source and Distribution of Immigration in 1917

Seventy-five per cent of the 1917 immigrants were composed of only fifteen so-called races and settled in fifteen states as is shown in the following table:

RACE	NUMBER	STATE	NUMBER
South Italian.....	35,154	New York	84,639
English.....	32,246	Massachusetts	29,606
Greek.....	25,919	Michigan	26,407
French.....	24,405	California	16,354
Scandinavian.....	19,596	Pennsylvania	14,603
Irish.....	17,462	Washington	11,842
Hebrew.....	17,342	Illinois	10,690
Mexican.....	16,438	Texas	9,088
Spanish.....	15,019	Maine	8,878
Scotch.....	13,350	New Jersey	8,554
Portuguese.....	10,194	Connecticut	7,389
German.....	9,682	Ohio	6,908
Japanese.....	8,925	Minnesota	6,412
Negro.....	7,971	Arizona	5,433
Finnish.....	5,900	Montana	4,690
Totals.....	259,603		251,493
Total immigration.....	295,403		295,403

It is worthy of notice that the Negroes, Spanish and Portuguese came mainly from the West Indies, Central and South America and

Canada. A majority of the English, Irish, French, German, Scandinavians and Dutch entered the United States from British North America as did also a very large number of Hebrews, North Italians, Bohemians, Bulgarians and Finns.

In general, the internal trend of migration followed that of the previous years, the North European peoples going mainly to the northern states the entire breadth of the country, the Chinese and Japanese to the Pacific States, and the Mexicans principally to Texas and the neighboring southwestern states. The Greeks are becoming fairly widely distributed while Hebrews and South Italians remain for the most part east of the Mississippi and north of the Ohio River. In New York, Massachusetts, Michigan, California, Pennsylvania we get the greatest variety of races in the greatest numbers. As usual very few immigrants settled in the Southeastern states.

Sex Ratio

The sex ratio of immigrants is an important factor in racial intermixture. On an average, there were sixty-nine females to one hundred males. There was a surplus of females among the immigrants Koreans (158 per cent), Irish (127 per cent), Japanese (114 per cent), Magyar (108 per cent), Portugal (109 per cent), Mexican (104 per cent), English and Scotch (102 per cent), and a high proportion among South Italians (97 per cent), Hebrew (93 per cent), Bohemians (91.2 per cent), and Negroes (90 per cent). The proportion was much smaller among North Italians (68 per cent), French (49 per cent), Russian (34 per cent), Greek (23 per cent), Chinese (18 per cent), and Spanish (13 per cent). Among emigrants the proportion of females was invariably much lower, on an average thirty-seven females to one hundred males.

Rejections

4.2 per cent of those applying for admission were rejected. The causes assigned were: "probability of becoming public charges, physically or mentally defective, contagious diseases, contract laborers and inability to read. The most common pathological causes for rejection were general defects, nervous or special sense diseases, skin diseases, diseases of internal organs and diseases of the circulating system.—LOUIS R. SULLIVAN.

A COMPREHENSIVE IMMIGRATION POLICY AND PROGRAM. By Gulick (S. L.)—*Scient. Month.*, N. Y., 1918, VI, 214-223.

The need of adequate and wise immigration and Americanization legislation is, in the view of the author, imperative; and it should be enacted now, while the war suppresses the tide of newcomers to our shores, and in preparation for the afterwar influences, during which "we have reason to expect a large immigration of people that will prove extremely difficult of Americanization."

"The legislation needed should deal with:

"1. The regulation of immigration. "The United States should so regulate, and, where necessary, restrict immigration as to provide that only so many immigrants of each race or people may be admitted as can be wholesomely Americanized. . . . The maximum permissible annual immigration from any people should be a definite per cent (say five) of those from that people who have already become naturalized citizens, together with all American-born children of immigrants of that people.)" Aliens with first papers, and women and children under fourteen years of age, should be admitted freely; while unmarried women twenty-one years of age and over might, if thought important, be subject to the percentage rate. Should the restriction required by the 5 per cent plan be regarded as excessively severe the percentage rate could be advanced; and in order to provide for those coming from countries from which few have become American citizens a minimum permissible annual immigration of, say 500 or possibly 1000 might be allowed regardless of the percentage rate.

"2. The registration of aliens. (The number of those individuals of each race or people already in the United States who have become Americanized affords the best basis of the measure for the further immigration of that people.)

"3. The distribution of immigrants. (American standards of living should be protected from the dangerous economic competition of immigrants, whether from Europe or from Asia.)

"4. The education of aliens for American life. (Such provisions for the care of aliens residing among us should be made as will promote their rapid and genuine Americanization and thus maintain intact our democratic institutions and national unity.)

"5. The federal government should be empowered by Congress to protect the lives and property of aliens.

"6. All legislation dealing with immigration and with resident aliens should be based on justice and goodwill as well as on economic and political considerations."

It is the opinion of the author that the above measures, if adopted would "coördinate, systematize and rationalize our entire procedure in dealing with immigration and solve in a fundamental way its most perplexing difficulties. Such a policy would protect American labor from danger of sudden and excessive immigration from any land. It would promote the wholesome and rapid assimilation of all newcomers. It would regulate the rate of the coming of immigrants from any land by the proved capacity for Americanization of those from that land already here. It would keep the newcomers of each people always a minority of its Americanized citizens. It would be free from every trace of differential race treatment. Our relations with Japan and China would thus be right."

The author invites criticism of his plan.

SOME REMARKS ON THE BIRTH RATE. By Adair (Fred L.)—*Journal-Lancet*, Dec. 15, 1917.

We have been very remiss in this country about invoicing our human assets and liabilities. Such information as we have shows that for the registration area, our present birth rate is 24.9 and the death rate 14 per 1000. Billings estimated the birth rate of the United States at 30.95 in 1880 and 26.68 per 1000 in 1890. The percentage of children under 10 years of age to the total population was 29.1 in 1850 and 22.2 in 1910.

Statistics from various parts of the country show that the foreign born population has fewer sterile marriages and a greater number of children than the native born population which is not productive enough to maintain itself. A comparison of the birth rate of our country with that of European countries shows only four with a lower birth rate.

France (1912) 19 per 1000; Switzerland (1913) 23.1 per 1000; Belgium (1912) 22.6 per 1000; Eng. and Wales (1913) 24.1 per 1000; United States (1915) 24.9 per 1000. The important facts are that our birth rate is diminishing and that our native born population apparently has a death rate in excess of the birth rate. The average family should have three to four children to maintain a stationary population.—F. L. A.

ABNORMAL CLASSES

OBSERVATIONS ON CRANIAL ASYMMETRY [in the Insane]. By Adler (Herman M.)—*Am. J. Insan.*, 1917, LXXIV, 89-99.

After all the progress physical anthropology has made in this country during the last twenty years, it is distressing to find medical men, in measuring the head or the skull, to still have a recourse to such instruments as "cephalometers" and hatters' "conformateurs;" and to see such venerable journals as the *American Journal of Insanity* lend its pages to a reproduction of the horrible figures secured by the "conformators." However, the figures in question are not the only unsatisfactory parts of the paper under consideration, and it would have been a great service to the author if it had never been published in its present form. The conclusions it embodies are erroneous.

ON CRANIAL MEASUREMENTS OF PERSONS DYING IN INSANE HOSPITALS. By Lowrey (Lawson Gentry)—*Bost. Med. & Surg. J.*, 1917, CLXXVI, 899-901.

The author, Pathologist to the Danvers State Hospital for the Insane, gives a limited number of measurements on the crania of 73 insane of different classes, who died in the Hospital. As could hardly be otherwise expected the results are inconclusive. Other measurements made on the insane in this country have not been made use of.

THE PROPORTION OF MENTAL DEFECTIVES AMONG JUVENILE DELINQUENTS. By Crafts (L. W.) and Doll (E. A.)—*J. Delinquency*, 1917, II, 119-143, 191-208.

This is a series of four good, related articles, "on the proportion of mental defectives among juvenile delinquents." Part I deals with the influences which govern the selection of material; Part II deals with terminology, classifications, diagnostic methods and criteria, and presentation of data and results; Part III consists of a critical review of typical experimental investigations; Part IV presents a constructive plan for further work in this field. Each article of the series is as complete as may be; the completed series constitutes a critique of the present status of the subject." Conclusions are given in the fourth number.

THE FAMILY OF THE NEUROSYPHILITIC. By Solomon (Harry C.) and Maida H. Solomon—*Proc. Nat. Conf. Soc. Work*, 44th Ann. Meeting, Chic., 1918, 443-451.

The family of the neurosyphilitic is the family of the syphilitic. A group of families of 247 syphilitics were examined. Of 160 families in general practice 52 (23 per cent) of 226 individuals examined showed a positive Wassermann Reaction; of 72 families of syphilitics without central nervous system involvement 31 (35 per cent) of 91 individuals examined gave a positive reaction. In the population at large percentages of those with a positive reaction are given varying from 5 to 15 per cent. Of the entire group of 247 families examined 84 families (34 per cent) were sterile, 49 (20 per cent) had abortions, miscarriages, still births and dead children. The average birth rate per family was 1.7 while the average of living children was 1.3. Only 61 families (25 per cent) showed no defect as to children or Wassermann Reaction.—H. C. S.

THE AMERICAN INDIAN AND ESKIMO

CHILD LIFE AMONG THE SMITH SOUND ESKIMOS. By Hovey (E. O.)—*Am. Mus. J.*, 1918, XVIII, 361-371.

A paper of popular and ethnological nature, but accompanied by thirteen very good and in some cases delightful photos of the Smith Island Eskimo and their children.

EXCAVATIONS AT HAVIKUH, NEW MEXICO. By Hodge (F. W.)—*Explor. & Field Work of the Smithsonian Inst. in 1917. Smiths. Misc. Coll.*, 1918, LXVIII, 61-72, 15 fig.

While mainly archeological, this report gives a number of good illustrations of the skeletal remains discovered during the excavations at the old Zuni pueblo of Havikuh, with notes on the burials. The explorations continue and the skeletal material which has already been recovered and is being preserved with scrupulous care, promises to be of considerable importance.

THE VANISHING INDIAN. By Hrdlička (A.)—*Science*, 1917, 266-7; another account in *Explor. & Field-work of the Smiths. Inst. in 1917. Smiths. Misc. Coll.*, 1918, XLVIII, 55-60, 7 portraits.

Brief report on author's endeavor to ascertain the physical type of the Shawnee and Kickapoo. The number of remaining full-bloods among the Shawnee of Oklahoma was found to be very small (one old man and two old women), and among the Kickapoo conditions were still worse (only one woman claimed full-blood and she uncertain). So far as living full-bloods are concerned the two tribes are practically lost to anthropology.

NOTES ON THE HANDS AND FEET OF AMERICAN NATIVES. By ten Kate (H.)—*Am. Anthropol.*, 1918, XX, 187-202.

A study based chiefly upon the outlines on paper of 44 hands and 42 feet, belonging to 54 subjects, including 31 North American and 18 South American Indians, with 5 Cariburges and Bush Negroes; and observations on the length of the fingers of a 6 Navaho and 18 Zuni Indians.

The results seem to indicate that certain differences exist both in the hand and foot indices, between the North American and South American Indians, the hands and feet of the latter being mostly broader. "The second toe exceeds the first more frequently in length among the South American Indians. The outward deviation of the first toe, the more or less fan-like disposition of the other toes, and the interstices between them are also more frequent among the South American Indians, as well as the concave incurvation of the foot." The general muscular development of the hands in both sexes is about equal among the North American and South American Indians; the muscular development of the feet, in correlation with that of the legs, however, generally seems to be in favor of the North American Indians of both sexes.

MÉLANGES ANTHROPOLOGIQUES; VI—Indiens d'Amérique du Nord —By ten Kate (H.)—*L'Anthrop.*, 1917, XXVIII, 369-401.

A final report by the author on his measurements of 237 adult Indians and 229 Indian children of the south-western tribes, made in 1887-1888. The present report is, in the words of the author himself, a revised and augmented edition of his former article on the subject, published in Volume 3, 1892, of the *Journal of American Ethnology and Archaeology*.

The observations relate to the Pimas, Papagos, Yumas, and Maricopas.

In his conclusions Doctor ten Kate defends the notion of heterogeneity of the American Indian, in which he is quite right, so far as the detailed and individual characteristics of the various tribes are concerned. But these differences are no greater than those among the various sub-divisions of the white race, and are not strong enough to disturb the more comprehensive concept of fundamental unity of the American race and the yellow-brown race in general.

STUDY OF THE FOX, SAUK AND POTAWATOMI INDIANS. By Michelson (Truman)—*Explor. & Field-Work of the Smiths. Inst. in 1917. Smiths. Misc. Coll.*, 1918, LXVIII, 90-95.

STUDIES AMONG THE INDIANS OF CALIFORNIA. By Harrington (J. P.)—*ibid.*, 92-95.

ETHNOLOGIC WORK IN LOUISIANA. By Swanton (John R.)—*ibid.*, 100-105.

These are brief reports of ethnological character, but accompanied by a number of fair to good portraits of the Indians and mixed bloods dealt with.

THE INDIAN IN OHIO. By Shetrone (H. C.)—*Ohio Arch. & Hist. Quart.*, 1918, XXVII, 274-510.

"A comprehensive account of the aboriginal inhabitants of the territory comprised within the State of Ohio." The treatise was prepared especially as a guide and book of information for the visitors of the Museum of the Ohio State Archeological and Historical Society, at Columbus, Ohio, but will be found useful to students of the "mound-builders" and the mound region in general. It includes remarks on the physical anthropology of the Indians, and a map giving the distribution of Indian tribes over Ohio within the historic period. It would be improved in a future edition by better bibliography.

ORIGIN OF AMERICAN ABORIGINES: A FAMOUS CONTROVERSY. By Wright (Herbert F.)—*Cath. Hist. Rev.*, 1917, III, 257-275.

A historical paper, dealing especially with the controversy on the question of the origin of the American aborigines between Grotius and de Laet in the seventeenth century. In his bibliography the author does not cite any of the modern anthropological literature on the subject beyond Winsor's *History of America* and Bandeliers article on "America" in the *Catholic Encyclopedia*.

ANTHROPOLOGICAL PROBLEMS PECULIAR TO THE UNITED STATES

THE MOUNTAINEERS OF TENNESSEE. By Hrdlička (A.)—*Explor. & Field-Work of the Smiths. Inst. in 1917. Smiths. Misc. Coll.*, 1918, LXVIII, 50-55, 5 portraits.

Brief account of the author's studies of the mountaineers of the Bristol district in Tennessee. These interesting people are of old American stock, but not generally of the best heredity, or best physique. Still they are bodily and mentally neglected rather than retarded. The army training will be a godsend to many of the younger generation.

THE MULATTO IN THE UNITED STATES. By Reuter (Edward Byron)—12 mo., Boston, 1918, 417 pp.

A thoroughly good book on a subject which seldom receives unbiased or scientific consideration. The treatise "is not a brief in behalf of, nor in opposition to, racial amalgamation; yet it presents certain of the facts which must be known before any pronouncement of scientific value can be made upon that subject. Neither is it a study of the race problem, in the narrow sense in which that phrase is popularly understood, yet it presents certain facts which must be taken into account in any intelligent dealing with that problem. The book is an attempt to state the sociological problem arising when two races, divergent as to culture and distinct as to physical appearance, are brought into contact under the conditions of modern life and produce a hybrid offspring whose characteristic physical appearance prevents them from passing as either the one or the other. Under such conditions physical appearance becomes the basis for class and caste distinctions; a biological phenomenon gives rise to a sociological problem."

The book deals with Mixed-blood Races in General; The Mulatto: The Key to the Race Problem; The Amount of Race Intermixture in the United States; Nature of Race Intermixture in the United States; The Growth of the Mulatto Class; Leading Men of the Negro Race; The History and Biography of the Negro; The Negro and the Mulatto in Professional and Artistic Pursuits; The Negro and the Mulatto in Business and Industry; The Mulatto in the Inter-Racial Situation; and The Mulatto in the United States.

The author reaches the conclusions that the intermixture of the American white and Negro races has gone on during the whole period that these races have been in contact, but that it was particularly rapid during the colonial era, owing to the scarcity of white women and lack of racial prejudice, which had not as yet developed. The intermixture, however, has been almost exclusively outside the bounds of marriage, and by the lower elements of white men with the Negro women. The resulting mulattoes have nevertheless at all times been superior to the full blood Negro, and have always enjoyed opportunities greater than those enjoyed by Negroes of unmixed blood. Of the score or so of men of first-rate ability which the race has produced, not more than two at the most were Negroes of pure blood. "Of some two hundred and forty-six persons, presumably the most successful and the best known men the race has produced, at least thirteen-fourteenths are men of mixed blood." As a rule "the higher the standard of success, the lower the percent of full-blooded Negroes."

"The mulattoes at present are the leading men of the race and the indication is that they will become more and more so as time goes on. . . . The ideal of the Negro is a light-colored man. . . . The mulattoes are everywhere proud of their white relationship and anxious to preserve it. Nearly every man of the group marries a

woman lighter than himself. . . . Furthermore, the mulatto group continually is being improved by the addition to it of the best blood of the Negro race. The black man of ability, in almost every case, marries into the mulatto caste. . . . The mulatto group thus, on the assumption of the transmission of superior mental capacity, tends to become not only a culturally but a biologically superior group" to the full-blooded Negro. . . . The mulattoes are the vital point in the whole race problem.

II. WAR ANTHROPOLOGY

LA FRANCE DE L'EST (Lorraine-Alsace). By Vidal de la Blache (P.)—2 éd., 8°; Paris, 1918, 280 pp., 3 maps.

A high class work on Alsace-Lorraine by the noted French geographer. In the main, however, a work on the Alsace and Lorraine of the more modern times and the present, and that essentially in respect of their political history, geography and economics. The old history and ethnography of these countries receive but passing notices. The scope of the volume will best be seen from the few following selected headings of chapters:

The formation of the "France de l'Est," The country; Alsace; The plains of Lorraine; The people of Lorraine; Entrance into the French union; The old régime; The revolution and social state; The industrial evolution; Western and eastern Europe.

The maps give a density of the population in Alsace-Lorraine and the neighboring districts of France; the movement of population by cantons from 1871 to 1917; and the commercial movement on the waterways of Alsace-Lorraine.

THE SOUTHERN SLAVS (THE "YUGO-SLAVS"): THE BULGARS, SERBS AND OTHER BALKAN PEOPLES. Within the last two years a number of books were published dealing historically, ethnographically and politically with the imperfectly known peoples of Southeastern Europe. These publications are written mainly by historians and geographers of the nations concerned, are essentially informative, and in addition more or less propaganda. They would not need to be touched upon in this *Journal* were it not for the fact that they give us in English or French many otherwise scattered or inaccessible data on the origin, migrations, contacts and amalgamation of the different racial groups with which they are concerned. The most recent publications of this order are as follows:

THE GEOGRAPHICAL DISTRIBUTION OF THE BALKAN PEOPLES. By Cvijić (Jovan)—The Geogr. Rev., 1918, V, 345-361, 1 map.

The distinguished Serbian professor gives a succinct outline of the distribution of the various racial groups over the peninsula. While the account is not only that of a man of science but also a Serb patriot, and while it is a résumé of the subject rather than

a new piece of research, it is nevertheless much superior to other recent publications on this difficult field. The map in particular is of value.

YUGO SLAVS.—*LA QUESTION YUGO-SLAVE*. By Primorac (Vouk)—8°, Paris, 1918, 302 pp.

A well-written book which gives historical, demographic, economic and social data on the southern Slavs, and will be found of value by students of the Yougo-Slav problem. It is supplemented by bibliography.

SOUTH-EASTERN EUROPE. By Savič (Vladislav R.); with Introduction by Nicholas Murray Butler—8°, N. Y., 1918, 276 pp., ethnographic map.

Written by a Serb, this book deals more particularly with the Serbian people and while of no direct value to anthropology, it is, in the words of Doctor Butler, "a book which makes appeal to every intelligent reader who wishes to have the knowledge necessary to form an independent opinion as to the conditions on which durable peace shall rest."

LA DALMATIE L'ITALIE ET L'UNITE YUGO-SLAVE. By Voinovitch (Comte L. de)—12mo, Genève, 1917, CIX, 1-380.

A detailed and valuable historic, demographic and political study of Dalmatia. Includes, besides other items of interest to anthropology, J. Cvijič's map of migrations of the Serb people. The historic data gathered in this book should prove of particular value to the student of Italian claims to Dalmatia, and of the Austrian oppression of the Dalmatian people.

MACEDONIA. By Georgevitch (T. R.)—8°, Lond., 1918, 288 pp., map.

This is the most comprehensive historic, ethnographic and political treatise so far issued on the country which for so long has been and still remains the bone of contention between Greece, Serbia and Bulgaria. Though written from the viewpoint of a Serb, the book bears the stamp of a scholar and is of more than passing value.

A SKETCH OF SOUTHERN SLAV HISTORY. Published on behalf of the Yugoslav Committee in London—12mo, Lond., 1917, 32 pp., large map, by N. Županič.

A brief compendium of the history of the Southern Slavs (exclusive of Bulgaria) with a good map of the territory covered by these people. The map (also published separately) is particularly serviceable.

LES SLOVÈNES. By Krek (Ivan)—12mo, Paris, 1917, 85 pp., map.

Historic, geographic, economic and other information about the Slovene people.

BULGARIA:—BULGARIA AND HER NEIGHBORS. By Historicus—8°, N. Y., 1917, 110 pp.

Includes chapters on "Who and what are the Bulgarians of today?;" "Serbian and Bulgarian Claims to Macedonia;" etc. The book, the work of a scholar, is of some anthropological interest; but plainly pro-Bulgarian.

WAR CYCLOPEDIA. Published by the U. S. Committee on Public Information; edited by F. L. Paxton, E. S. Corwin, & S. B. Harding. Wash., Gov. Pr. Off., 1st ed. Jan. 1918, 321 pp., 1 map.

A "pocket book" that in a brief handy form gives much timely information, and that in course of time may be made very useful. Unfortunately the ethnographic parts, though of the highest importance, are considerably below the standard of the rest of the articles and some are decidedly poor. The map attached to the volume calls also for improvement.

THE ENEMIES OF GERMANY (in Swedish). By Stiehl (O.)—12mo, Stuttgart, 1918, 30 pp. text, 96 pl.

A plaintive note on the great racial heterogeneity of Germany's enemies, written evidently for Swedish consumption, but with 96 excellent reproductions of photographs (busts) of racial types. For greater effect the ugliest negro is reproduced on the cover; and for further effect perhaps the booklet is marked "American copyright 1918," though an inquiry shows that no effort has been made or could now be made for its registration. The types shown are however, very interesting, though they plainly include some mixed bloods and show some selection.

THE INDIANS OF CANADA AND THE WAR. According to the *Bulletin de la Société de Géographie de Québec* (Aug. 1918, XII, 246-247), the Indian population of Canada which varies but little in numbers from year to year amounts at present to 109,294 pure and mixed blooded individuals. Of this number more than 2,000 recruits have already been sent to the front. It will be interesting to read some day how they compared in endurance and otherwise with the white soldier.

THE BIOLOGICAL ASPECTS OF WARFARE. By Campbell (Harry)—*The Lancet*, 1917, CXCIII, 433-435, 469-471, 505-508.

The scope of this paper will best be seen from the headings of the chapters, which are: The function of the combative instinct; The evolution of the combative instinct; The influence of man's hunting career and of tribal life on the evolution of the fighting instinct; The two sanctions of conduct; The checks of the operation of might; The influence of warfare in molding the individual; and Means of preventing warfare. "From the biological standpoint the combative instinct is to be regarded as a normal mental attribute. . . .

Two important factors have favoured the evolution of the combative instinct: the reproductive instinct, and the struggle for food." Man's nature in these respects is essentially what it was in his savage state. The chief factor in the evolution of his fighting instinct has been besides the reproductive instinct, the search after animal food, and inter-tribal warfare; the ultimate effect of these factors has been to make man of all vertebrates the most inveterate fighter.

After discussing the sanction, preparations, and limitation of might in man's conduct the author presents a brief enumeration of the effects of warfare on the individual and on the race. As to the latter he is of the opinion that "while primitive inter-tribal warfare operated eugenically by favouring a survival of superior types, modern warfare operates dysgenically by promoting the survival of inferior types. . . . But while modern warfare is thus *racially* harmful, *individually* warfare has always had some educational value. . . . There can be no doubt that military training has a beneficial influence, physical and mental, in moulding the individual." As to war itself, "while realizing that man has evolved through slaughter, and that every step in his long upward path has been stained with blood," modern warfare to the author is as inane as it is horrible.

"But though actual war is detestable, yet it must be confessed that indirectly it serves a useful purpose in that the fear of it leads a nation to exercise itself in the virile pursuit of arms and to hold itself in readiness to meet an enemy, while actual war rouses the community to put forth supreme efforts; and this striving to overcome a threatened or actual danger works beneficially and leads to the development of latent possibilities in a manner undreamt of in the easy-going times of peace. . . . A community long lulled in a state of blissful ease is bound to deteriorate, for all healthful life implies struggle. . . . It is only through struggle, fierce and sustained, that an individual or a nation can realize itself to the full." Viewed from this angle the ultimate effects of the war on the British Empire cannot but be beneficial.

"One of the great social problems confronting man in the future will be now, without having recourse to war with all its horrors, to counteract the enervating and degenerating effects of the ease and luxury which tend to be shared by a considerable section of every prosperous community."

The author has no remedy to suggest, except enlightenment. He foresees, however, that it will be long years before the English people "shall be in any danger of relapsing into dreamful ease and before that time comes the enlightenment may have come also."

In the final section of his interesting paper the author discusses the means of preventing warfare, the great weight among which he again assigns to enlightenment.

WAR AND THE BALANCE OF THE SEXES. By Jastrzebski (S. de)—*Eug. Rev.*, 1918, X, 76-80.

The writer discusses the problem of the disturbed balance of the sexes, produced by the war. The excess of females of child-bearing age over males of similar period of life, which in England was already marked before the war, has risen greatly in that country since 1914 and is still rising. By the end of 1917 the proportion of females to males between the ages of 20 and 60, in Great Britain, has increased to 1,150: 1,000. For the immediate problem that confronts England through these conditions, the author sees no satisfactory solution. Assisted emigration can not take care of more than a part of the surplus, and as for the future, "the only remedy seems to lie in the greater preservation of male lives." There is a great disparity in the sex mortality in England as compared with other countries and the after effects of the war are likely to emphasize still further the excess of male deaths. Some improvement in this direction may possibly be effected. The rate at birth is favorable, and since June 1915 it has been continuously above the average.

FEMALE EMIGRATION FROM ENGLAND.

The subject of assisted emigration from England, after the war, of a proportion of the large number of superfluous women of that country, is receiving steadily increased attention by the English economists as well as scientists. The prevailing feeling is that such emigration within proper limits is desirable, and if rightly directed into the Colonies of the Empire, may be expected to result in promotion of marriages and in hastening of the numerical recuperation of the race. Two recent interesting contributions to the discussion of this topic are as follows:

EMIGRATION AFTER THE WAR. By Gell (P. Lyttleton)—*Eug. Rev.*, 1918, X, 88-91.

This writer accentuates the opinion that from the standpoint of the Colonies, and from that of eugenics, the most desirable emigrants will be not the more highly educated women, but the mentally and physically healthy single women who may become the servants, maids, farm help, housekeepers, nurses, and eventually the helpful wives of the settlers. The whole subject calls for the formation of a governmental "Emigration Executive Board."

SALVATION ARMY EMIGRATION. By Lamb (D. C.)—*Eug. Rev.*, 1918, X, 91-93.

This communication points to the past and prospective services of the Salvation Army in assisting suitable female (and other) emigration to the English Colonies. After the war, the Salvation Army "will be fully prepared and equipped to take an important share in the work of reconstruction," and may under proper advice render important services in the great demographic problems that in these respects will confront Great Britain.

POST-BELLUM MEDICAL PROBLEMS: CONSERVATION OF THE RACE. By Marcus (Joseph H.)—*N. Y. Med. J.*, 1917, CVI, 1076-1078.

Good article of a general nature. The author accentuates the fact that little if any harm will result to the race from the maimed, for "traumatic lesions are never transmitted hereditarily." The prospects for the future of the race are on the whole reassuring. "Gravely as the young male population has been depleted in the war we may anticipate that the quality of the race will not be injuriously or permanently affected." The restoration will take time, but it is already proceeding; "the need for fresh habits of life is being felt and even fashion lends its aid by encouraging women in the direction of motherhood." There is no reason for apprehension even in the case of England and France; they have managed to make good their losses in previous great wars, and "we may safely predict that after the present war, the population will heal its wounds even more rapidly since these will be treated with that sovereign balm—Victory."

IMPERIAL HEALTH AND THE DYSGENICS OF WAR. By Saleeby (C. W.)—(and the Duchess of Marlborough)—*J. State Medic.*, 1917, XXV, 307-316.

There is perhaps no country today which pays more attention to the important problems of the effects of the war on the race than Great Britain, and this paper is one of the many that deal with parts of the subject. Dr. Saleeby calls attention particularly to the happy effects of the anti-typhoid protection. Among those in the English armies, who have not received the protective serum, the annual morbidity from all forms of typhoid and paratyphoid fever was 1260 with the death rate of 206 per 100,000; while among the protected these proportions were respectively 200 and 4 per 100,000.

The Duchess of Marlborough calls attention to the lowering birth-rate in England, to the high prenatal and infant mortality, and to the urgency, for the sake of the future of the race, of improvement in these directions. Fortunately the State is "fully alive to the need for stringent measures to ensure race preservation, and has set an example to the municipalities and to citizens in general;" in addition to which "the long hoped for and much heralded Ministry of Health. . . . is, we hear, in process of creation."

CURRENT NOTES

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON has since 1917 devoted its activities as far as possible to the anthropology (in its broad sense) of the peoples at war. The program which has met with remarkable success was and is as follows:

Program for the Season 1917-1918

- October 2, 1917. *Bohemia and the Bohemians*. By Aleš Hrdlička, Curator, U. S. National Museum.
- October 16. *Greece*. By Dr. Mitchell Carroll, Secretary, Archaeological Institute of America.
- November 6. *Belgium and the Belgians*. By Dr. James H. Gore, George Washington University.
- November 20. *Rumania and Her People*. By Mr. George Julian Zolony.
- December 4. *The Scandinavian Peoples*. By Dr. Amandus Johnson, University of Pennsylvania.
- December 18. *Japan*. By Dr. Daniel Folkmar, U. S. Tariff Commission.
- January 15, 1918. *War Anthropology*. Discussion led by Aleš Hrdlička, Curator, U. S. National Museum.
- January 29. *Poland*. By Dr. Leo J. Frachtenberg.
- February 12. *Scotland*. By Dr. Joseph Dunn, Catholic University of America.
- February 26. *The Problem of Race and Nationality in Russia*. By Dr. Peter Alexander Speck, Library of Congress.
- March 12. *The Origins of the Chinese*. By Edward T. Williams, Chief, Division of Far Eastern Affairs, Department of State.
- March 26. *The Origins of the Italian People*. By Dr. V. Giuffrida-Ruggeri, Professor of Anthropology, University of Naples.
- April 9. *Mesopotamia and Palestine*. By Professor Paul Haupt, Johns Hopkins University.
- April 23. *Some Ethnological and National Factors in the Present War*. By William H. Babcock.

Program for the Season 1918-1919

- October 1, 1918. *Persia and Its People*. By Mirza Ali-Kuli Khan. M.D., Chargé d'Affaires of Persia.
- October 15. *Serbia and the Jugo-Slavs*. By Honorable L. Michailovitch, Ex-Minister for Serbia. (Meeting cancelled on account of epidemic influenza.)
- November 5. *Why Austria Failed to Become a Melting Pot*. By Dr. B. Vosnjak.
- November 19. *The Peoples of Central Asia*. By Dr. Albert H. Putney, Chief of the Division of Near Eastern Affairs, Department of State.
- December 3. *Siam and Its People*. By Mr. Frederic Dean. (Introduced by the Siamese Legation.)
- December 17. *Armenia and the Armenians*. By A. K. S. Schmavonian, Division of Near Eastern Affairs, Department of State.
- January 7, 1919. *China*. By Mr. C. W. Bishop, of the Museum of the University of Pennsylvania.
- January 21. *Palestine*. By Dr. Otis A. Glazebrook, recently United States Consul to Jerusalem.
- February 4. *Russia and the Russians*. By Aleš Hrdlička, Curator, U. S. National Museum.

- February 18. *Serbia and Macedonia*. (Speaker to be announced.)
 March 4. *Bulgaria and the Bulgars*. (Speaker to be announced.)
 March 18. *Turkey*. (Speaker to be announced.)
 April 1. *Social Conditions in Persia*. By Honorable Charles W. Russell, recently United States Minister to Persia.
 April 15. *India*. (Speaker to be announced.)

DENTAL EXAMINATION. A series of promising examinations of the teeth, dental arches and palate, among the recruits for the United States Army, has been undertaken under the auspices of the American Museum of Natural History. The scope of the study is shown in the following blank. The work is under the supervision of Dr. Clark Wissler; Dr. B. W. Weinberger has personal charge of the examinations and measurements.

DENTAL EXAMINATION

1. Serial No.....	Order No.....	Photo. No.....
2. Name.....	Age.....	
	Right	Left
3. Teeth Present {	Upper 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8
	Lower 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8
4. Teeth, Regular.....	Irregularities {	Anterior.....Rotated.....
		Posterior.....
5. Remarks.....		
6. Missing teeth.....	Supernumerary Teeth.....	Anomalous Teeth.....
(Congenital)		(in form)
7 Occlusion		
A. Normal Occlusion	B. Posterior Occlusion	C. Anterior Occlusion
1. Simple.....	1. Bilateral.....	1. Bilateral.....
2. Complex.....	2. Unilateral.....	2. Unilateral.....
8. Bite, Normal.....	Open.....	Under.....
9. Median Line.....		Edge to Edge.....
10. a. Shape of Dental Arch.	1. Elliptical.....	2. Ovoid.....
	3. Approaching	4. U-shaped.....
	Circular.....	5. Diverging
11. Vault of Arch. Medium.....	High.....	Low.....
12. Angle of Symphysis. Normal.....	Protruding.....	Sub-Average.....
13. Condition of the Mouth. Healthy.....	Unhealthy.....	
14. Malformations. Cleft Palate.....	Hare Lip.....	Tumors.....
Measurements		
15. Width across Cuspids. Lower.....	Upper.....	
16. Width across Molars {	First, Lower.....	Upper.....
	Second, Lower.....	Upper.....
	Third, Lower.....	Upper.....
17. Length from Central at Median Line to Lower {	First.....	Upper {
	Second.....	First.....
	Third.....	Second.....
		Third.....
Remarks		

CENTRAL CHILD WELFARE INSTITUTE FOR SCOTLAND. According to the *British Medical Journal* of August 17, 1918, p. 173, "at a conference of representatives of Scottish local authorities, held recently under the presidency of the Lord Provost of Edinburgh, a committee was appointed, on the proposition of the Lord Provost of Aberdeen, to prepare a scheme for the organization of a central Child Welfare

Institute for Scotland which the Carnegie United Kingdom Trust has offered to establish in Edinburgh." The Institute will be "a place for study, research, and conference, and a promise of £2,000 for research work in connection with it had already been received."

A society for the study of human heredity and means for improving the race, has recently been established by the physicians of Sao Paulo, Brazil.

SKELETAL REMAINS FROM SOUTHWESTERN ILLINOIS.—An interesting find of aboriginal remains has been made recently near the mouth of the South Wood River, Illinois, not far from St. Louis. Workmen excavating on a small hill just inside of the Roxana oil refinery unearthed the bones of approximately fifteen skeletons. It was learned that on previous occasions other skeletons were found in that vicinity. Most of the specimens uncovered were unfortunately taken away by visitors from Alton and Wood River, before attention could be called to their possible scientific value; but due to the courtesy of the Roxana Petroleum Company four well preserved crania and the bones of two skeletons were presented through the Bureau of American Ethnology to the United States National Museum. They proceed evidently from quite old burials. The skulls show a remarkably uniform Algonquin type.

CRANIA OF THE HAIDA AND OF THE TLINKIT. During his 1917 and 1918 geological investigations along the northwestern coast, Dr. Edwin Kirk, of the United States Geological Survey, has found a number of old far out-of-the-way Haida and Tlinkit burial caves and sites, from which he collected a series of well preserved crania and other skeletal parts for the United States National Museum. The skulls are particularly valuable, being not only according to all indications those of unquestionable full-bloods, but also wholly free from any deformation. The crania are uniformly brachycephalic, and except in minor features show a practical identity of type in the two tribes.

Dr. Frank Baker, since 1883 Professor of Anatomy at the Georgetown University, for many years Superintendent of the National Zoological Park, and one of the oldest living members of the Washington Anthropological Society, died at his Washington home on September 30, 1918, in his seventy-eighth year. His principal service to anthropology was his editing, from 1891 to 1898, of the *American Anthropologist*, but inconspicuously he assisted in many ways in the development of anthropology in Washington. In 1897 he was President of the Washington Anthropological Society, as well as of the Association of the American Anatomists. His publications were essentially anatomical.

Dr. Hrdlička has spent the month of November in a survey of the southernmost parts of the west coast of Florida. The results of the journey, which proved exceptionally arduous on account of the diffi-

cult swampy terrain and the mosquito pest at this season, were the location of a series of hitherto unrecorded burial mounds and village sites of the old inhabitants of this coast, some of which appear to be of considerable importance; and the unhoped for finding of several full-blooded Seminoles, one of whom at least could be induced to submit to detailed examination. The region covered was that from Naples to near Cape Sable.

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